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JULY, 1934

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A study in detail: The huge fins of the Sikorsky S-42, the largest transport airliner ever developed in America.

NRA MEMBER U.S. WE DO OUR PART

Southwestern AVIATION

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Editorials and Comments

The Industry and Recovery

With all the widespread labor difficulties attendant to many major industries at the present time, an impressive fact comes to light in favor of Aviation, wherein harmony exists between employer and employee.

With all the talk of economic recovery going around and the time and money being expended to bring about that recovery, it is necessary to admit that the aviation industry is making one of the most valuable and notable contributions. Intelligent leaders are at the controls; specialized, superior and highly trained individuals make up the bulk of employees in the industry's every phase. Perhaps in this accepted fact may be found the reason for our labor harmony.

A major transport company which failed to secure an air mail contract over a portion of its lines recently withdrew its operations on the division. The majority of its employees were transferred into other operating divisions. No finer exhibition of cooperation for an increased employment has, as yet, come to our notice.

New Reflector

The Independent Aviation Operators of the United States are making a sincere and definite effort to discover and foster constructive measures that would be of genuine help to the entire industry. Their energies should be applauded; and in the formation of their 1935 program everyone interested in any phase of our national aviation should make suggestions to this organization to facilitate its function of reflecting current opinion.

A recent questionnaire broadcast into many channels of aviation has resulted in sound and feasible suggestions. Some of the most frequently mentioned are:

1. Have a law enacted immediately which will provide for Federal Registration of title, mortgage or other conveyance effecting aircraft. Standardize the title laws so that airplanes can be sold and financed properly.

2. Foster and encourage the production of a good, reasonably priced airplane, particularly designed to appeal to the general public.

3. A planned National Campaign to encourage the wide-spread use of airplanes by the general public, both for private and business uses.

4. Make the physical examination cheaper and easier for non-commercial pilots.

5. Pilots throughout the United States seem to resent the present high rates charged universally by life insurance companies, and request that something be done about it.

6. Start a nation-wide campaign to see that special taxes levied upon the aviation industry be used for the benefit of that industry in place of spending the funds for purposes not connected with aviation.

7. Insist on the public facilities, such as the radio beam, weather information, etc., being extended to the private flier as well as to the transport companies and the Air Corps.

8. Organize touring information and register airports, as well as the various charges to visiting ships.

9. Notification of the I. A. O. of all government contracts and bids open to aviation operators, in order that the information can be widely disseminated.

10. Encourage the eleven Regional Districts organized by the I. A. O. to promote air tours for private fliers from one district to another in order to facilitate inter-district acquaintanceship with conditions and other pilots.

The Independent Aviation Operators solicit other suggestions from the industry. Communications should be addressed to them in care of the Chase Hotel, St. Louis, Missouri.

Airline Reserves

With the air mail controversy now passing into history, it is well to look back for constructive measures that might be gained from the errors and failings disclosed during the stormy months just past.

Of late, attention is being given to the further development and perfection of our air defense. In some of the present plans put forth in regards to the possibilities of unforseen national emergency, the personnel and equipment of the commercial airlines are listed as potential military weapons of defense. Although the conversion of the superior equipment could be effected readily, the training and shaping of the personnel into a military unit would require much time unless previous preparation was maintained. If reliance is to be placed upon this vast reserve, steps should be taken for its training.

A step could be taken especially at this time while all energies are being directed for an improvement in all phases of our national aviation. A proviso or clause could be incorporated into the air mail contracts, stipulating that all companies holding contracts are to grant a specified period of time each year for the military training of pilots. The time allocated for military purposes should be other than the normal vacation period, as prior to the present time the majority of pilots flying for the airlines were granted short vacations, which left little opportunity for those holding commissions in the Air Corps Reserve to continue maintenance of a military status.

Blind Flying

A recent order received at the Air Corps Training Center calls for blind flight training to start immediately when the student starts his regular flight training period at Randolph Field. The students are to

(Continued on Page 32)

The Fourth Airways District

of the

Air Navigation Division, Bureau of Air Commerce

BY G. C. MILLER, Acting Superintendent of the Fourth District

THE BUREAU OF AIR COMMERCE is divided into two main divisions, the Air Regulations Division and the Air Navigation Division.

The primary functions of the Air Navigation Division are the development, installation and maintenance of Federal aids to Air Navigation. The Washington office performs the first two functions whereas the third, maintenance, is accomplished by the six district offices of the Air Navigation Division under the supervision of the Washington office. The headquarters of these districts are located at Newark, New Jersey; Atlanta, Georgia; Chicago, Illinois; Fort Worth, Texas; Salt Lake City, Utah and Oakland, California.

Erstwhile Helium Plant, now Headquarters of the Fourth Airways District. The Fire-proof plant buildings provide safe housing for the District's maintenance supplies, shops and offices.

In general, the Federal aids consist of: intermediate landing fields, airway beacons, radio broadcast stations, radio range stations, weather reporting stations, "A" type marker stations, "B" type marker stations, and a nation-wide communication system utilizing long line teletype and radio telegraph services. This communication system provides for an interchange of aviation weather reports throughout the country, handles messages necessary to safeguard aircraft in flight and handles the urgent messages of the Aeronautics Branch.

The Fourth Airways District, with headquarters at Fort Worth, Texas, was established July 1, 1929. It includes the states of Louisiana, Arkansas, Texas, Oklahoma, New Mexico and Arizona. The 4,500 miles of Federal airways located in the District include 60 intermediate landing fields, 280 airway beacons, 14 radio broadcast stations, 19 radio range stations, 24 weather reporting stations located at intermediate fields, 3 "A" type markers, and a complete communication system covering the Federal airways in the District. The "A" and "B" type markers are low power radio communication stations and low power radio range stations located at intermediate landing fields. The personnel of the District totals approximately 350 persons and includes laborers, caretakers for fields and beacons, airway keepers at weather reporting stations, radio operators, airway mechanicians, airway radio electricians, specialized mechanics, office personnel and supervisory personnel.

The District Headquarters

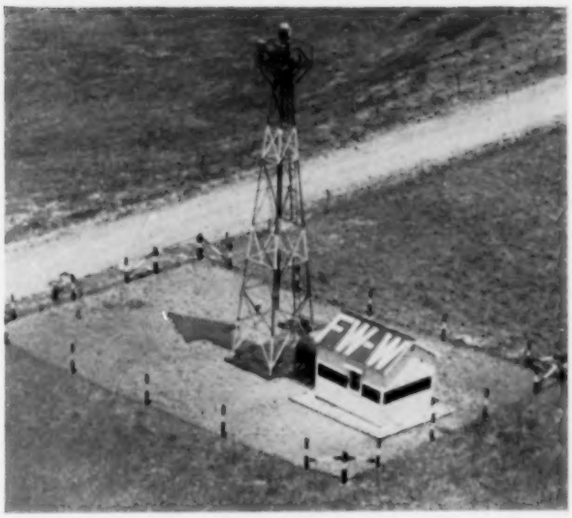
Early in 1929 the Bureau of Mines, Department of Commerce, moved its helium plant from Fort Worth to Amarillo. The Fort Worth plant buildings and considerable shop equipment were then transferred to the Bureau of Air Commerce for use as District headquarters. This arrangement has proved ideal. The concentration of airways at this point makes it possible to reach any Air Navigation aid in the District by airway without loss of time, while the fireproof plant buildings provide safe housing for the District's maintenance supplies, shops and office.

The entire operation and maintenance of the District is centrally controlled from the Fort Worth headquarters by the administrative staff. Each phase of the work is assigned to a specialized administrative officer who is responsible to the District Superintendent for the proper functioning of the equipment and personnel under his particular jurisdiction. Frequent field inspections by the Superintendent and administrative officers insure efficiently coordinated operations throughout the various field units.

The bulk of the maintenance supplies used throughout the District are purchased on national contracts and

warehoused in the District Headquarters Storeroom pending distribution to the field units. This method is found to be expeditious and economical since the semi-annual requisitions from the field units, which cover hundreds of items supplied by numerous contractors, can be filled and shipped in one lot without loss of time. Most of the airways equipment is brought into the District Headquarters shops for major overhaul where highly specialized mechanics, using precision tools, accomplish this work on a systematic production line basis.

The District Headquarters office negotiates contracts for supplies, electric energy, leases and services not performed by District personnel, and disburses the funds which are allotted annually covering all costs of operation and maintenance within the District. Detailed accounting, cost and engineering records are kept by the office. An extremely accurate property and cost record is maintained by each field unit or employee charged with the custody and use of Government property. The system precludes careless or injudicious use of property and supplies while furnishing costs and engineering data covering each Air Navigation aid.



A typical airways beacon. These lighted aids are spaced from twelve to seventeen miles apart over thousands of miles of Federal Airways.

Lighted Aids

Airway beacons and lighted intermediate landing fields are located, as nearly as possible, on straight lines between terminal airports. The fields are spaced approximately 50 miles apart while the beacons are spaced from 12 to 17 miles apart, as required by the nature of the country. The fields are equipped with a beacon, a lighted wind cone mounted on the beacon tower, white boundary lights, green approach lights at ends of runways, and red obstruction lights on obstacles within a 15-to-1 gliding angle of the field. The beacons are of the revolving type and produce a narrow, high intensity, clear beam of approximately 1,000,000 candlepower. In addition to the clear beam, each beacon shows a colored light; red indicating that the beacon *is not* located at a landing field; green indicating that the beacon *is* located at a *lighted* landing field; and amber indicating that the beacon is located at an established but *unlighted* landing field.

Practically all airway lighting equipment in the District is operated by electric energy although small acetylene gas units are used in a few places, usually to mark small hills which are dangerously near an intermediate landing field. At points where commercial power is not available, gasoline engine generators of the "farm lighting plant" type are installed in a small power shed adjacent to the beacon tower. In order to adequately insure the safety of the flying public the more vital units are installed in duplicate, one acting as a standby which automatically goes into operation should the operating unit fail. This dual installation is carried out in beacon lamps, obstruction lights and the engine generating plants. The control of beacons and of lighting equipment is fully automatic, being accomplished by a truly remarkable little robot "caretaker." This "little man" has more than human intelligence in many respects. The beacons and field lighting equipment must be turned on at least 15 minutes after sundown and operate until 15 minutes before sunup. The exact time by the clock changes each day with the sun. This complicated schedule, however, does not worry the "little man" in the least, and at the proper time he throws the switch turning the lights on or off as the case may be. If, during the night, the main beacon lamp or an important red obstruction lamp burns out, he instantly throws the standby lamp into operation. However, the place where he really "does his stuff" is at a site where the dual engine generator plants are installed. If everything is running satisfactorily he will alternately operate No. 1 engine one night and No. 2 engine the next. A minute or so before the beacon is scheduled to come on he starts up the engine "having the duty" that night and gives it time to warm up before taking the load. If for any reason this engine is having trouble in starting, he will crank it for a short period and then try the other engine. If that is a bit cranky about going to work, he will try first one and then the other, until he gets one going, or is satisfied that neither is capable of "going on duty." In cold winter days he maintains a constant watch on both plants to keep them from freezing or getting too cold to start. As soon as the water temperature in either radiator reaches 40 degrees F. he starts the plant up and runs it until the water has reached 150 degrees F., using the electric current generated by the plant while running to heat the oil in the crankcase. Like most human beings this "little man" has his limitations; he hasn't as yet learned to change oil, add water and clean up the power sheds, so a local resident is employed to "give him a hand" with these duties.

Airways Mechanicians and Caretakers

For maintenance purposes the airways are divided into sections covering approximately 20 lighted aids each. An airways mechanician is assigned to each section and is made responsible for the operation and ordinary repair of all lighting equipment and fields on that section. Local residents are employed as part-time caretakers to assist him at fields and at beacon sites operated by engine generator plants. He is headquartered in the city nearest the center of his section, where a small storeroom is furnished to house the six

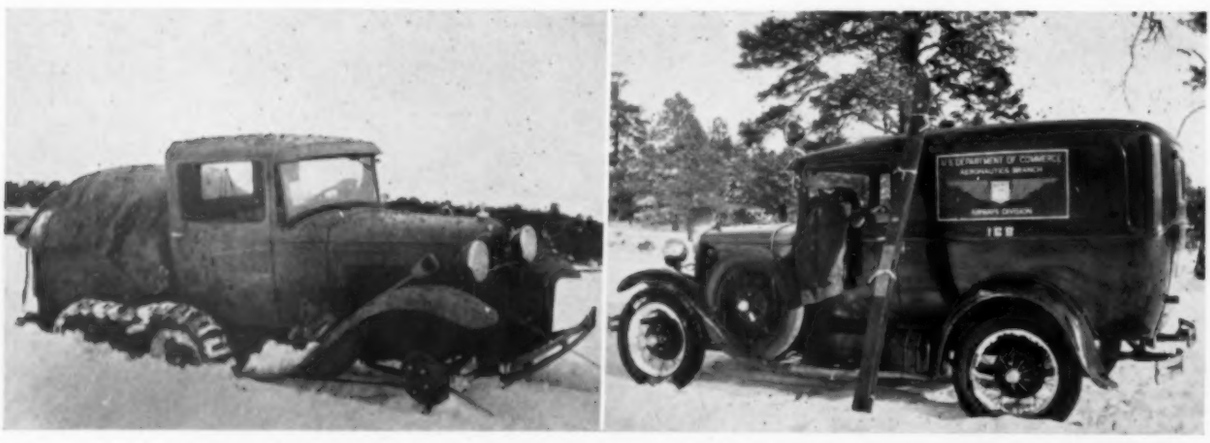
months' supply of maintenance and replacement parts required on the section. The mechanician, using a light half-ton panel truck, makes routine inspection trips over his section, checking and adjusting each piece of equipment in accordance with standardized practices, The week-ends are usually spent in his headquarters drawing supplies, bringing his property records up to date and handling necessary paper work. This systematic routine servicing is carried on week after week and accounts for the very few outages which occur in the District from causes other than lightning and storms.

Many sections in the Fourth District present difficult maintenance problems for the mechanicians. This is especially true of the sections lying in the desert and mountainous regions. However, mechanicians in the eastern portion of the District, no doubt, believe that black gumbo mud is as bad as anything their friends in the West encounter. From Raymondville to Kingsville, Texas, the airway crosses huge cattle ranches far from improved highways; here it was found impossible to negotiate the sandy trails with the service truck during dry spells until "doughnut" airwheels were placed on the market. In the mountains of northern Arizona and New Mexico the mechanicians have little difficulty until winter comes, and then it is a continuous battle with snow. In the winter of 1932 a severe blizzard caught a large number of Indians who were gathering pinon nuts in the Zuni Mountains, marooning them and making it necessary for planes to go to their rescue dropping food and supplies. The nation wide publicity given the incident made no mention of the mechanician who was caught at an isolated intermediate landing field. He stayed in the power shed subsisting on his meager emergency rations until the storm abated three days later and then made his way to an Indian trading post on skis fashioned from barrel staves found in the power shed. Two weeks later he was able to reach civilization on snow shoes, however, his truck was not brought out until spring. He now carries snow shoes as a part of his regular equipment. One mechanician in southern Arizona maintains a section on which many beacons are located on mountain peaks. In making one trip over this section he has to walk 23 miles to reach the beacons. While this mileage is not exactly vertical it is considerably inclined. One

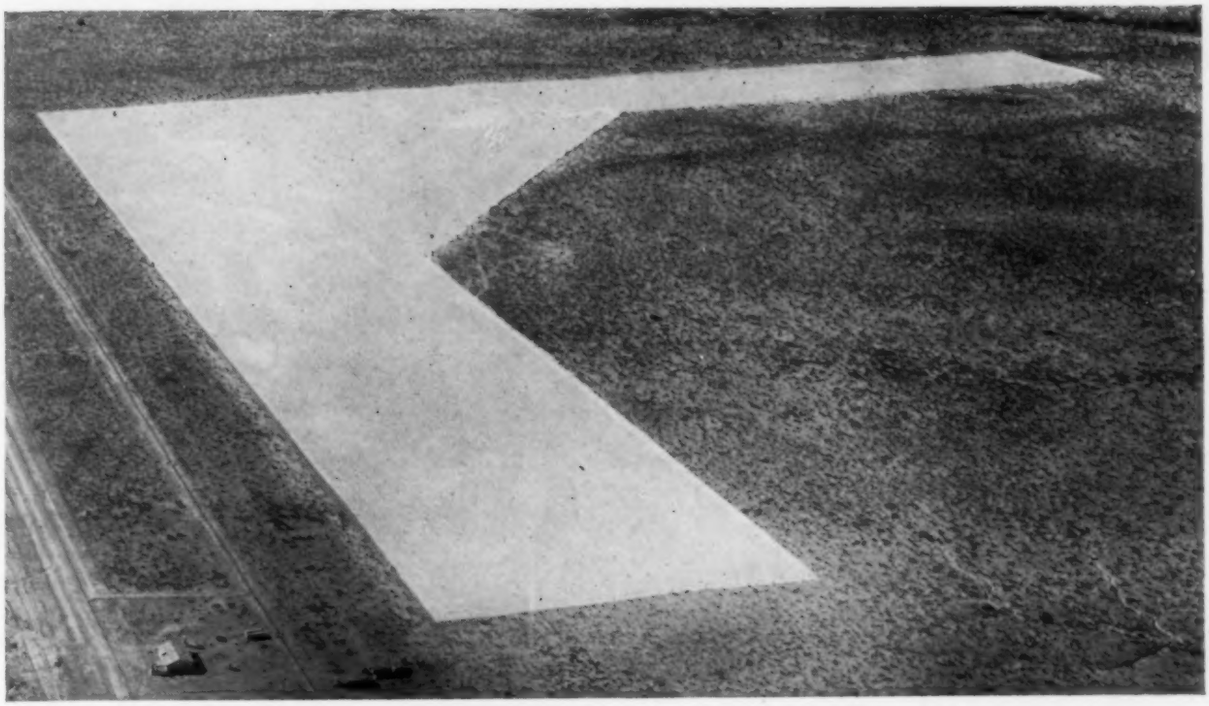
A New Mexico rancher caretaker beautifies his site. The flag is flown on holidays and special occasions.

site takes six hours to climb and this must be done during the first hours after daylight since the mid-day temperatures in summer go well above the scale of an ordinary thermometer.

To offset these difficulties, there are many interesting angles to the work, especially if the man appreciates scenery hunting and ruins of past civilizations. Both the Southern and Mid-Transcontinental airways traverse some of the most interesting country in America. Ruins of ancient Indian civilizations in the Salt River Valley, at Casa Grande, Walnut Canyon and other places; Tombstone, Arizona, with its Boot Hill; the Apache country near Douglas; the Petrified Forest; the Painted Desert; Meteor Crater; El Morro Rock with its inscriptions and dates cut by Spanish priests and soldiers in 1526 and later; and hundreds of other interesting places are on the regular routes of the mechanician. As a matter of fact the mechanician west of Albuquerque now uses the old Spanish Trail traveled by the Conquistadores in their search for the Seven Cities of Cibola, and finds it in apparently much the same condition as when the Spaniards first traversed it.



Taking supplies into El Morro, New Mexico Intermediate Landing Field. A light truck equipped with skiis in front and tractor treads in the rear. Right: Skiis are regular equipment for the Airways Mechanician in the Mountain Sections.



Intermediate field at Salt Flat, Texas—The sandy desert wastes are no longer barriers for present day flyers. The Bureau of Air Commerce' intermediate landing fields are spaced approximately every fifty miles over the Nation's lighted airways.

The resident caretakers at the sites may or may not be as interested in the local beauties of nature as was the old Utah cattleman, who, when asked what he thought of Bryces Canyon, replied "Well, it is one 'heck' of a place to drive cattle," but they are vitally interested in the beacons and fields which they help to maintain. There is usually a keen rivalry between adjacent caretakers, each trying to outdo the other in the appearance of his site. And if "Bill Jones' " beacon goes out, it is the talk of the countryside for weeks. The picture on page 6 illustrates the pride which the caretakers usually take in their sites, the rock lined roadway, white star and flag pole were installed by this rancher on his own time and at his own expense. He flies his flag on holidays and on special occasions. At most fields the caretakers got to know the pilots on the line and often receive their daily news of the outside world from papers dropped by their pilot friends. At beacons operated by engine generator plants the caretaker makes a periodic checkup of the operating conditions and lamps, checks gasoline, changes oil, adds water to the radiator and batteries, keeps the equipment clean and checks the light each night to see that it is burning. In case of trouble which he cannot clear he gets word to the mechanician. At a field he makes minor repairs to the surface, such as filling small washes and gopher holes, and patrols it regularly, marking areas which become unuseable by reason of heavy rains, snowdrifts and sand drifts. In event a plane lands the caretaker records the pilot's name, plane number and reason for landing, and renders such assistance as may be required. If necessary he sells the pilot sufficient gasoline to get him safely to the next airport. The District keeps 87 octane gasoline in 5-gallon hermetically sealed tins at each field for emergency use.

Intermediate Landing Fields

In the establishment and design of intermediate landing fields, the Bureau of Air Commerce has kept pace with the development of aircraft used over the airways. In the early days when the mail was flown in small single-motored planes, without passengers, 40-acre pastures 30 miles apart served the purpose. The modern field, however, is usually L or T shaped, having run-ways 600 feet wide and from 2,500 to 4,000 feet long depending on the altitude of the field. The runways are well drained, have a level, well sodded surface and only enough slope to insure the rapid runoff of surface water. Vegetation on the fields is kept below 14 inches in height, the necessary mowin being done by local farmers on a contract basis. Particular attention is paid to approach areas and obstructions within a 15-to-1 gliding angle are removed if possible, or adequately marked by red obstruction lights. In event the field, or any portion of it, becomes unuseable, it is marked by red flags in the daytime and red lanterns at night and full information concerning the condition is sent to airports and transport companies by wire or radio and is broadcasted by the airways radio stations in the territory.

New fields in the eastern part of the District require constant maintenance during the first two or three years after establishment due to fills settling and washes which develop before a thick sod is grown; thereafter mowing is about the only maintenance required. In the western part of the District, however, the fields require constant attention. The country being sandy and arid little vegetation grows and this only serves as a starter for sand drifts during the sand storm season; heavy summer rains cut great washes through the fields each year. These conditions make it neces-

(Continued on Page 22)

Missouri's Aerocade

THERE WILL BE history making when the Missouri State Chamber of Commerce air fleet of some thirty ships leaves the capital city on the morning of July 17 for its circle tour of the state, for it will be the first time a governor of Missouri has surveyed from high in the sky the whole domain over which he rules. With clear skies and fair weather the panorama will be one of such grandeur and beauty that even a king might experience a glow of prideful possession.

The itinerary of the Second Annual Aerocade, which will be held July 17, 18, and 19, has been arranged and includes visits to thirty-nine Missouri cities and towns, with stop-overs at ten of that number. The tour is being held in the interest of aviation and the general development of interior towns and communities in Missouri.

In speaking of the tour Dwight H. Brown, Secretary of State of Missouri, declared that there is every indication that the effort of the Missouri Chamber of Commerce this year will establish a new mark for other states to shoot at. "Missouri being the center state—five states east and five states west, two states north and two states south,—it is logical to expect the airways of the nation to converge in Missouri just as have the railroads," he declared. "Missourians are more and more mindful of the part aviation is to play in the future of the state. The building of ports at this time in many towns throughout Missouri bespeaks that realization."

The Aerocade, which will consist of from twenty-five to thirty ships, will leave the Jefferson City Airport at 9 a. m., July 17, for southeast Missouri. It will fly over Eldon, Bagnell Dam, Iberia, Rolla, Salem, Ellington, Greenville, Bloomfield, and arrive at Sikeston for a noon luncheon stop. Leaving Sikeston at 2:30 p. m., the fleet will circle over New Madrid and Hayti and arrive at Kennett for the second stop of the tour. Taking off from Kennett, the planes will reach Poplar Bluff for a night stop, flying over Campbell en route to that destination.

The second day of the tour will find the air squadron leaving Poplar Bluff, flying over Doniphan, Alton, and landing at Koshkonong for a 2-hour stop. Entering the air again the fleet will soar over West Plains, Willow Springs, Cabool, Mountain Grove, Mansfield, Seymour and Diggins, arriving at Springfield at 10:50 for a forty-minute visit. Leaving there the ships will descend on Carthage for lunch. From Carthage the aerocade will proceed directly to Nevada, flying over Lamar and reaching Camp Clark where the Missouri National Guard is in encampment, for the second night stop.

The air tour planes will take off from Nevada on the morning of July 19, fly over Butler, Clinton, Windsor, Sedalia and Slater, reaching Marshall for a hour and a half stop. Leaving there the ships will roar over Brunswick and arrive at Brookfield for more than an hour's stay. From there they will fly over Macon and Moberly, reaching Mexico for luncheon. The Mexico stop will mark the end of the tour and the planes participating will proceed from there to their home ports in St. Louis, Kansas City, Jefferson City and elsewhere.

Jimmy Haizlip, who will pilot the Flagship of the tour.

The air tour fleet will be in charge of Major Phil Love, Commander of the 110th Observation Air Squadron, 35th Division Aviation, National Guard of Missouri, and the passenger list will be a distinguished one. It will include Gov. Guy B. Park, Frank G. Harris, Lieutenant-Governor; Dwight H. Brown, Secretary of State and president of the State Chamber; Forrest Smith, State Auditor; Richard R. Nacy, State Treasurer; Charles A. Lee, Superintendent of Schools; V. H. Steward, Motor Vehicle Comissioner; Col. Al Linxwiler, postmaster of Jefferson City; Colonel Paegelow, retired U. S. Army officer and formerly Commandant of Scott Field in Illinois; Harold W. Brown, Adjutant General and Dr. J. D. Brock of Kansas City, chairman of the aviation department of the State Chamber of Comerce. Capt. James Haizlip of St. Louis, who holds many cross country speed records will pilot the flag ship.

Numerous features have been arranged for the tour. One of the ships participating will shower cities over which the fleet flies with paper parachutes bearing greetings and messages from cities and towns participating in the tour. All of the aviators taking part will be pilots of long experience and outstanding ability.

Missouri towns, coroporations and individuals are invited to join the tour at any point of the scheduled itinerary which will soon be announced definitely. Mindful of the aims of the tour and of the ultimate part that aviation is to play in the future progress of the state it is required that trustworthy planes and qualified pilots be entered.

Dr. John D. Brock, Chairman of the State Aviation Committee, is in charge of all plans for the Second Annual Air Tour. Dr. Brock holds the world's record as a citizen flyer, having made daily consecutive flights for more than four years, rain or shine, totalling close to 2,000 daily flights.

The air-minded Secretary-Manager of Missouri's State Chamber of Commerce, George A. Pickens, who with Dwight H. Brown will represent the State Chamber on the tour.

Col. A. Linxweiler, Jefferson City's veteran flyer and Aerocade Sponsor.

"Tex" Lagrone," old buddy of Col. Charles Lindbergh and veteran Kansas City flyer, who will fly over Missouri with the aerocade.

Aircraft 1934

Upper left: Bellanca Senior Skyrocket.
Upper right: The 225 H. P. Beechcraft.
Left: The Vultee V-1A Transport.

Bellanca Senior Skyrocket

SUPERSEDING ALL PREVIOUS Bellanca specifications, the Bellanca Aircraft Corporation of New Castle, Delaware announce full production for their two 1934 models, the Skyrocket and Pacemaker, cabin landplane models.

The first plane of the 1934 series to be delivered is a Senior Skyrocket De Luxe model to Mr. L. P. Bonfoey, president of the Monroe Chemical Company of Quincy, Illinois; chairman of the Illinois State Aeronautics Commission, and Democratic National Committeeman for the State of Illinois.

Another order has been placed for the second plane of the Senior Skyrocket model by the Tennessee Valley Aathority and delivery will be made shortly. This new Government unit will use the plane for extensive travel, survey work and inspection.

Powered with the Pratt & Whitney "Wasp S1D1" Engine, which develops 525 H. P. at 2200 R. P. M., the new models carry five passengers and a pilot and cruise at 159 m. p. h. Top speed is 185; it climbs 1240 feet per minute and has a range of 910 to 1280 miles.

The fuselage is 4 inches wider than on previous models, thus giving added aisle width as well as providing wider and more spacious seating arrangements. By means of a duct located beneath the fuselage floor, fresh air is taken from a point on the front wing strut and supplied to the cabin. Butterfly valves in the floor supply air to each individual seat, and the two main ducts terminate into two large outlets at the rear cabin wall, affording a continuous supply of fresh air. Heating, too, is accomplished with the same system, the pilot being able to control the mixture of the heated air and the cold air by means of a master valve.

The fuselage is of welded chrome molybdenum steel tubing covered with fabric. The landing gear is of cantilever type of the same tubing with oleo shock-absorbing struts enclosed in the fuselage in cross-wise or opposed fashion, transmitting landing gear loads from each arm to the opposite side of the fuselage.

Riveted dural, all-metal split flaps occupy the trailing edge of the wing on the underside from the fuselage to a point about two-thirds of the way to the tip. From this latter point ailerons extend almost to the tip of the wing, permitting more sensitive and positive action in control. The aileron and flap mechanism is entirely enclosed within the surface of the wing.

The full N. A. C. A. type engine cowl is firmly attached by means of a compression system, whereir felt pads in individual sockets are made to fit tightly and closely over the rocker-box heads by means of a master screw tightening device. The entire circle of cowling is comprised of four large segments, so that removal of but one will expose a large part of the power plant installation and equipment to view for inspection or service.

The instrument panel is provided with rubber shock insulating devices to reduce vibration. Instrument lighting is indirect and is regulated by means of a rheostat located on the panel.

Fifteen cubic feet of baggage space is afforded and is accessible from the outside or within the cabin.

The plane is bonded and shielded for radio with a built-in partition over the rear seat for radio installation.

Beechcraft B17L

A NEW JACOBS POWERED, 225 horse power four-five place Beechcraft is now in production at the Beechcraft factory in Wichita. There are many notable refinements and outstanding features of this new model, the B17L, that deserves the wide interest it is receiving.

Boasting of a top speed of 175 miles per hour, the new Beechcraft has a cruising speed of 152 miles per hour and a landing speed of 45 miles per hour. The relatively slow landing speed is attained by decelerators which are built into the under side of each lower wing. When preparing to land these wing sections are opened fan-wise, retarding the speed of the plane.

Retractable landing gear is incorporated into the new model. Automatically controlled, the landing gear is retracted into the space provided in the under part of the fuselage. The opening is automatically shut and locked. In landing, it is impossible to close the throttle without releasing the landing gear latches and lowering the wheels into landing position. An auxiliary manually operated control is also provided.

With the normal useful load set at 1,130 pounds and a normal gross weight at 2,730 pounds, an allowance for extra equipment of 420 pounds is offered. Under full load the climb at sea level is 1,000 feet per minute. Service ceiling is set at 15,000 feet.

The framework is of welded steel tubing and covered with fabric and aluminum. Length over all is 24 and one-half feet, span is 32 feet and over all height is eight feet six inches. The wings are typically set in inverse stagger.

The cabin offers compact arrangement. Both forward seats are on slides and may be moved backwards or forwards when entering the front seats, utilizing all space for seating. The cabin is sound-proofed and the acoustics are set at a relatively low decibel. Either warm or cool air is supplied by the ventilating system.

Ample vision at all angles is attained. The windshield is of safety glass, molded to eliminate sharp corners and is made complete in two sections.

The throttle, mixture, landing gear control and stabilizer are located in the center of the dash.

R. P. M. at rated horse power is 2,000. Fuel capacity, 50 gallons. Normal range 650 miles. Fuel consumption at cruising speed, 12 gal. per hour. All necessary instruments are standard equipment.

Vultee Model V-1A Transport

THE AIRPLANE DEVELOPMENT CORPORATION, Model V-1A Transport, is an all-metal, 10-place, single engine, low wing cantilever monoplane with retractable landing gear and tail wheel and split trailing edge type wing flaps. It is designed to be a super-high speed transport to carry both passengers and mail. As the ship is primarily intended for use on scheduled air lines, it is equipped with full night flying instruments and flares, and a complete Western Electric two-way radio installation.

The plane is powered with the new Wright Cyclone Model F engine which develops 735 h. p. Sufficient gasoline tankage for a range of 1000 miles is provided. The plane, as mentioned before, is of the low wing cantilever type. The pilot's cockpit is situated immediately behind the engine. It is fitted with a vee type forward sloping windshield. The pilots are separated from the passenger compartment by a sound proofed bulkhead which has a door through which they enter. The eight passengers are seated two abreast. The cabin seats are especially designed for the plane and are adjustable to six positions. A 12 inch aisle separates the seats. The fuselage is 68 inches high and 58 inches wide. Ample room is afforded for a very comfortable seating arrangement. Behind the last seat is located the main cabin door, and immediately opposite the door is a fully equipped lavatory which is so arranged as to afford maximum room when in use. Immediately behind the lavatory is situated the baggage compartment. Behind this is the main radio installation.

The cantilever wing is faired into the fuselage so that its bottom is tangent to the bottom of the fuselage. The wheels, which are completely enclosed and perfectly flush when retracted, fold inwards into the leading edge of the wing's bottom surface. The mechanism is so designed that the movement required for retracting the gear is simply a rotation of the cantilever leg of the gear around the pivot tube. The fuselage itself is of modified elliptical cross section. It is of true monocoque type, having no longitudinals.

The wing is in three parts, a center section which is integral with the fuselage, and two outer sections which are assembled to the center section by means of bolts. The center section contains the retractable landing gear and the gasoline tanks. The outer section which carries the leading-edge type landing lights and is removable in four sections, and the other a rear part which carries the principal structure of the outer wing and to which the ailerons and flap gears are attached. This part of the wing is of "shell" type construction, the main strength member being a corrugated upper and lower covering to which is attached a smooth outer wing covering of Alclad sheet. The entire wing is rendered accessible for inspection by the removal of the nose sections as the front shear beam of the rear section is of open truss type construction.

The retractable landing gear is of a novel and original type of construction. During the original layout of the ship it was considered very important to develop a retractable landing gear which was both simple in construction and positive in operation. With this goal in mind, a landing gear was designed which operates by a simple rotary motion about a pivot tube, the entire operating mechanism being merely a worm drive. It was also considered desirable to provide a method of control for the pilot which did not require much exertion or attention under emergency conditions, and which would operate the gear quickly. This was accomplished by the use of an electric motor drive which operates by the pilot merely throwing a togle switch and lowers the landing gear

(Continued on Page 30)

WASHINGTON

P. T. NORTON, JR.

An Aeronautical Accomplishment

AT LANGLEY FIELD, Hampton, Virginia, on June 28, 1934, the National Advisory Committee for Aeronautics told and showed the Army and Navy what it had accomplished in advancing the arts of the air.

Safety in flight, efficiency and convenience both in the large transport airplane and the military and private airplane were the salient features of the exhibition. Demonstrations were given showing the practical aeronautic values accruing from the intensive research conducted here in a plant unique in its completeness.

Enumerated among these practical results are: greatly reduced landing speeds, improved lateral control of planes, promise of higher horsepower in the engines without increase of size or weight. An outstanding feature of the display of improvements was the acceptance by the experts of the fact that the increased complications of the mechanisms of all the planes were, paradoxically enough, all making for increased simplicity and safety in its use.

Something entirely novel was displayed in effecting lateral control of planes. Retractable spoilers or curved structures extended up from the wing near its leading edge, used jointly with flap or airbrake go to make control so easy that pilots complained the "stick force" (resistance to manual operation) was almost too light.

A new control (through a suction device through a slot in the wink itself) of the "boundary layer" lying next to the upper surface of the wing was also shown. This control makes practical the use of high speed which otherwise would have too great a landing speed for safety. An increase in lift of 150 per cent is attained with use of only 2 per cent of the power in a light airplane. A simple lever control now operated the flaps with only slight force required. The resulting action is as an emergency brake on an automobile.

By installing a blower to cool a completely jacketed cylinder of an air cooled engine large increases in horsepower were obtained without increasing the engine size or weight.

A prototype of the modern flying boat was displayed in model from. It envisioned capacity and ability to carry fifty passengers safely across the Atlantic.

An important safety measure was also explained. This relates to vibration or "flutter." It was pointed out that if "flutter" reaches a certain intensity, the whole structure may crack to pieces.

A compression-ignition engine in the laboratories held spellbound onlookers being enlightened on combustion. Here heavy glass plates have been inset and lighted with 1,000 candlepower. High speed motion pictures portray the cycle of combustion thus made visually available for study.

In the coming months it is hoped to dwarf the progress of the last eighteen months—admittedly greater than that of the last sixteen years.

American transport planes are now in undisputed leadership—as witness the foreign orders coming in for them. Through improvement in streamlining as a result of the National Advisory Committee on Aeronautics research, American transport planes today carry identical or greater loads at twice the speed and on less horsepower than twenty-four months ago.

Through use of almost ideal tests afforded by the wind tunnel, problems encountered at speed of 500 miles per hour can be effectively studied. Phenomena, now unexplained, appear in the high whine of the powerful wind tunnel, and although the research engineers there are not yet willing to make predictions as to future speeds practicably attainable, they are already working on problems of flight at speeds attained by a pistol bullet. Their work has borne fruit in the past 18 months in producing the world's fastest transports. The result of these speed studies will no doubt be further reflected in further speed for American transports and military aircraft.

Research was greatly encouraged by the support and presence of representatives of the industry at the Conference held largely for those within it on May 23, 1934 by the N. A. C. A. at Langley Field.

About 250 of the "Great Names" in aviation were on hand. At Langley, all political differences are forgotten as they stand in awe of the wonders of science. Among the big names whose faces appear in the accompanying cut we see Dr. Ames, Admiral King, Eugene Vidal, Orville Wright, Dr. Abbott, Charles Lindbergh, James Doolittle, Thomas A. Morgan, Dr. G. W. Lewis and Harry F. Guggenheim, et al.

The Pensacola Naval Air Station

$5,363,500 is authorized to be appropriated for the Naval Air Station at Pensacola, Florida. Senate Bill 1103 which passed the Senate and the House of Representatives on June 16, 1934 provides:

"The Secretary of the Navy is hereby authorized to construct additional buildings, structures, roads, utilities and appurtenances, and to remove, relocate, replace, remodel and extend existing buildings, structures, roads, utilities and appurtenances at the Naval Air Station, Pensacola, Florida at a cost not to ex-

ceed $5,363,500 and said sum is hereby authorized to be appropriated."

When this sum is placed in the hands of the authorities, the present shortage of naval airmen can be quickly done away with. The Pensacola base has needed a financial boost to improve its physical layout for some time.

Amendments to the Air Mail Law

"Simplification of Administration" of Air Mail Routes and Contracts was effected when House Joint Resolution No. 366 was adopted by the Senate on June 16, 1934—that fateful Saturday evening when it was thought that the 73rd Congress would pass into history. The joint resolution had previously been adopted by the House

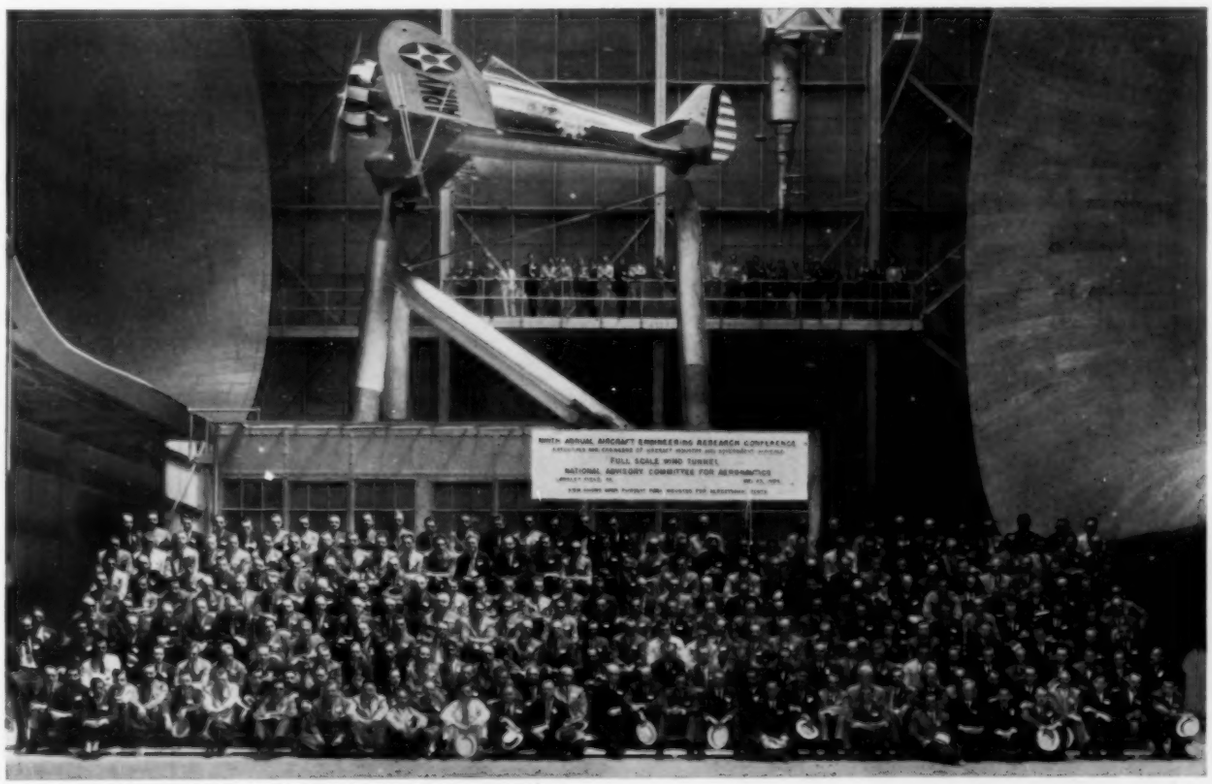
The amendment reads:

> "Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, that subsection (d) of section 3 of the Act entitled "An Act to revise air-mail laws, and to establish a commission to make a report to the Congress recommending an aviation policy," approved in June, 1934, is hereby amended by adding at the end thereof the following sentence: "The Commission created under section 20 of this Act shall review the designations made by the Postmaster General under this subsection, and include in its report to Congress its conclusions reached upon such review."
>
> Sec. 2. The first sentence of section 15 of such Act is hereby amended to read as follows:
>
> "After March 1, 1935, no person holding a contract or contracts for carrying air mail on a primary route shall be awarded or hold any contract for carrying air mail on any other primary route, nor on more than two additional routes other than primary routes."

The first provision requires the Air Commission established by section 20 of the recent Air Mail Law quoted verbatim in Southwestern Aviation's June, 1934 issue to review, report upon and make recommendations about Air Mail routes.

The second provision is very important in that it permits the Government to consolidate two *contracts* into one *route*, so that where there was a route on which it had received very low bids, such as the route from Newark, N. J. or New York to Los Angeles, which was divided in the advertising for bids into two routes and two contracts, one from Newark to Fort Worth, on which it received a low bid of 13 cents, and the remainder of the route for 39 cents, the Government could, when they are consolidated as this second provision permits, obtain for itself a very low rate across the continent.

It must be pointed out that amendments to the Air Mail Act were proposed (and which have subsequently passed) even before the Air Mail Law itself was signed by the President. This further demonstrates the necessity of full consideration of the Aviation situation by an impartial Commission. It was well-nigh impossible to draft comprehensive legislation which would stand up under fire and changing circumstance in the atmosphere in which the legislation



The N. A. C. A. Wind Tunnel at Langley Field, Virginia puts to the test a full scale airplane. Photographed during the May conference, which was one of the greatest gatherings of the nation's aviation noblement in recent years.

was of necessity drafted and considered by the Congress.

At first glance the second provision adopted above seems very similar to the provision in the Air Mail Bill itself (Sec. 15) which read:

> "After October 1, 1934, No air mail contractor shall hold more than three contracts for carrying air mail, and in case of the contractor of any primary route, no contract for any other primary route shall be awarded to or extended for such contractor."

But on second reading we note that the time of the effective date has been extended from October 1, 1934 to March 1, 1935, and further that in the bill itself *contracts* were dealt with, while in the amendment passed (HJR 366) we find that *routes* are to be dealt with—which—we submit—are two vastly different things.

An Opportunity for Service

The Commission of National Aviation Policy covering "all phases of aviation" set up by section 20 of the new Air Mail Law is not yet in existence. Assuredly it soon should be for there is much to be done. No idea prevails as to the identity of the five commissioners. It is known that the Commissioners must of necessity be the personal choice of the President since there is no opportunity nor provision for Senate confirmation. The personnel of the Commission is highly important.

Experience has shown that no commission is stronger than its individual members—the men who direct its policies. Recess appointments always place full responsibility with the President.

Within a few limitations set down in the Air Mail Law the Commission is directed to delve into "all phases of aviation." By this we presume that the Commission must determine what constitutes a "phase" of aviation and give that phase its immediate study.

The new amendment to the Air Mail Act quoted heretofore directs the Commission to "review the designations made by the Postmaster General may designate certain routes as primary and secondary routes and shall include at least four transcontinental routes and the eastern and western coastal routes among primary routes. The character and designation of such routes shall be published in the advertisements for bids, which bids may be asked for in whole or in part of such routes."

All the other "phases" are left to the broad discretion of the Commission. Under the heading of "phases" will likely come 1. Any provision that may be made for interchange of personnel between civil and military aviation. 2. Advisability of requiring the Federal Radio Commission to give equal facilities in the aeronautical band of radio frequencies to mail and passenger planes operating on regular scheduled routes. And most important 3. The determination of production methods for volume-production airplanes.

The fact that portions of the new Air Mail Law constitute *permanent* legislation must not be lost sight of. It is believed, however, that upon recommendation of the Commission, certain features of this so-called "permanent" legislation can be amended. A broad discretion is left to the Commission and there is no denial except by implication of the Commission's right to delve into any factor of aviation which will be beneficial to the final result it desires to obtain. What studies the Commission will instigate in view of the present condition of the law creating it remains to be seen. The trend can probably be followed and the results predicted before February 1, 1935 when it is to report to Congress. In the meantime we must be content with attempting to make our speculation logical.

Aircraft Accident Publicity

Full publicity will henceforth be given to the results of the Bureau of Air Commerce's investigation into serious aircraft accidents.

The closing days of the 73rd Congress saw an amendment to the Air Commerce Act of 1926 passed. The amendment has been signed by the President.

The Bureau of Air Commerce is now empowered to hold public hearings on aircraft accidents, administer oaths, examine witnesses, issue subpoenas for witnesses and documentary evidence and require preservation of evidence.

No suits or causes of action arising out of the accident may make use of material brought to light in the public hearings or statements thus obtained.

It is presumed, therefore, that these formal hearings are provided to determine and eliminate in the future the causes of the accident under investigation rather than obtain redress or fix liability for the particular accident under scrutiny.

The number of accidents and passenger fatalities have been materially decreased under the informal investigation methods heretofore prevailing.

It is predicted that under the new power allowed the Bureau, that facts can be far more accurately determined—that the mystery surrounding aircraft accidents will be removed—and the known causes brought to light and eliminated. This amendment is a highly commendable and important step in the realm of public safety. It is far better that the public know exactly why an accident happens than to grope, wonder and speculate about some inherent weakness in aircraft or the art of aeronautics that would conjure up a mental hazard of assuming some great risk by use of aircraft or airways.

The tremendous publicity given by the press to aircraft accidents clouds the fact that accidents are the minor exceptions to the general rule of millions of passenger-miles flown with safety and on schedule time.

One Step Nearer

The general public keenly anticipates the opening of bids on August 27, 1934, for the 25 new planes ordered by Mr. Vidal for the use of Bureau of Air Commerce Inspectors. We predicted Mr. Vidal's sincerity in the accomplishment of his original objective in the June issue. We were aware of his ingenuity. We were also aware that there are more ways to kill a goose than by decapitation. Not being able to perfect his project with PWA funds as originally planned, the

(Continued on Page 32)

Inspection of Aircraft

LANDING GEARS

By REAGAN C. STUNKEL

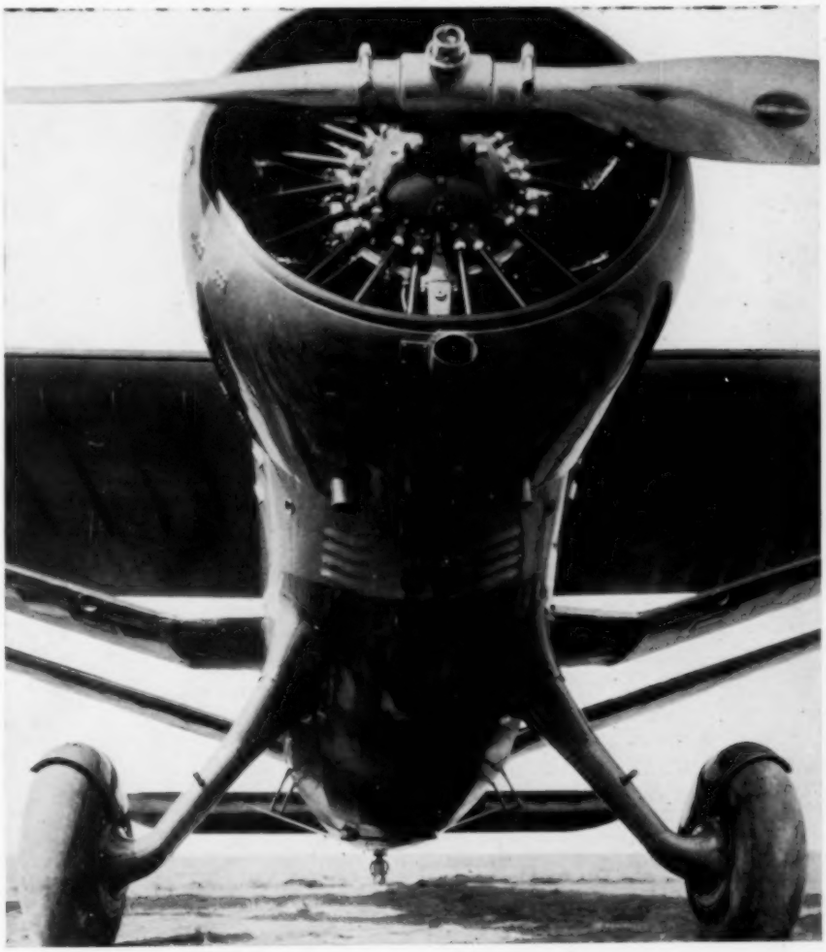
SINCE THE ENTIRE WEIGHT OF the airplane is supported by the undercarriage and this unit in addition is subjected to all the uneven loads of rough landings and taxiing over rough ground, it is reasonable to suppose that the inspector exercises unusual care in his examination of this mechanism. Knowledge of the functioning of the various types of undercarriages is an invaluable asset to the inspector, and in the consideration of the service and inspection of this unit, we will also review the principles of operation of the different types.

The Wheels

In the servicing of any landing gear, removal of the wheels is of prime importance. This facilitates the examination of the brake shoes and drums, the wheel bearings, the axle and the wheel retaining bolts and caps.

Brake drums should be tight in the wheel and the retaining screws or rivets tight. Modern aircraft wheels are usually of cast Lynite or aluminum. In this casting is a steel sleeve insert to form a hard bearing surface for the wheel bearings. It is well to determine that this sleeve is tight and secured in the wheel. The casting should, of course, be examined for cracks or evidence of distortion. The brake drum must be free from scored or rough places on the braking surface, and for good brake action should be perfectly round. Roller bearings give very little trouble as long as they are properly lubricated; however, they should be examined for loose or pitted rollers. While the wheel is off, an excellent opportunity is afforded for the examination of the tire. Particular attention should be given the bead, since this part of the tire is the source of a large number of tire failures.

Brake shoes may be cleaned of oil and dirt with denatured alcohol, and this is a practice that is highly recommended to secure long life and good action. The brake release springs should be in good condition and



Courtesy Pratt & Whitney.

An unusual photographic study of the cantilever design in landing gear construction as applied to the new Bellanca Senior Skyrocket.

should return the brake shoes to a neutral position without hanging or binding.

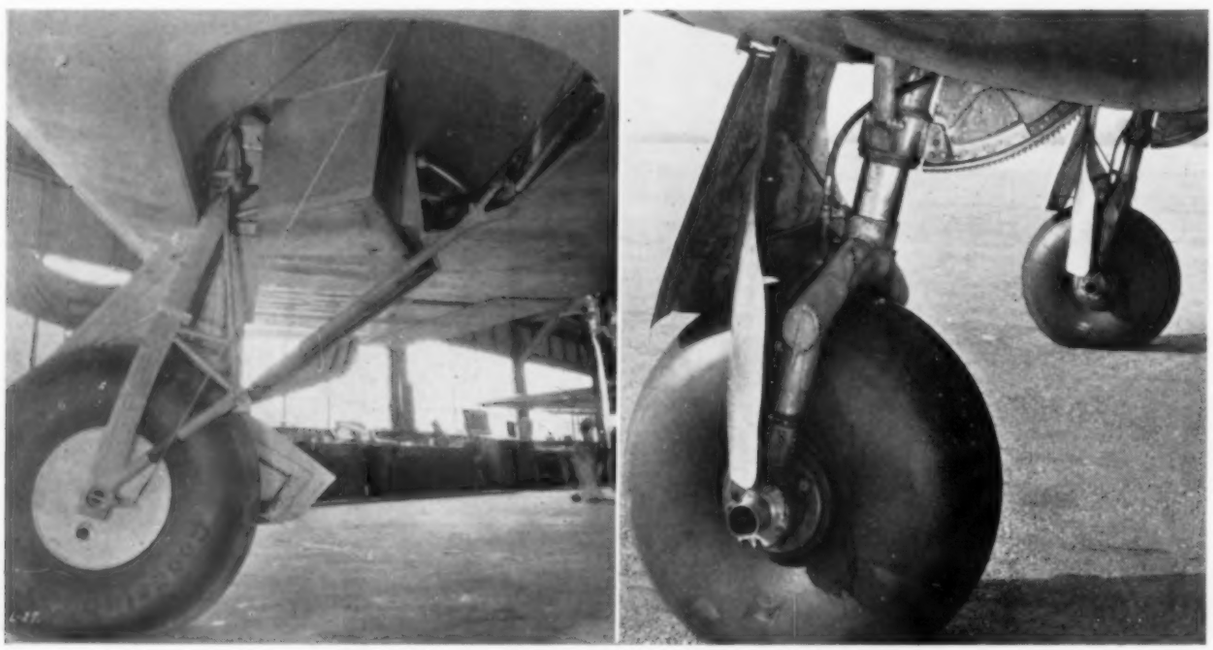
When the wheel is replaced on the axle, it is an opportune time to adjust the brake. Brakes must be adjusted so that they release without hesitation and take effect when applied without grabbing.

Shock Absorbing Units

After the inspection of the wheels, the condition of the shock absorbing struts and units may be determined. The conventional shock absorbing units use oil as a medium of absorbing shock, with additional springs to take the loads of taxiing. There is one type of strut that makes use of the pneumatic principle of shock absorbing to some advantage. In any case, it is necessary for the inspector to determine that the shock absorbing fluid chamber is full and that there is no evidence of broken springs. The older method of using rubber cord to absorb the shock is now limited almost entirely to the smaller ships. In checking shock absorbers of this type, the inspector should determine the condition of the rubber in the shock cord, and make sure that there is no oil on the outside of the cord. Oil has a decided deteriorating effect on the rubber strands in the cord. The shock unit attaching fittings should next be inspected for cracks or bending.

It is almost impossible to make a thorough examination of a landing gear without removing the weight of the ship entirely from the structure. This allows the inspector to feel the amount of wear in the various fittings with the benefit of the load being off the fitting. Particular attention should be given the condition of the bolts and bolt holes. While a slight amount of wear might not be dangerous, the more wear that is allowed to develop, the faster the process of wearing will continue. To replace a loose landing gear bolt or rebush a loose fitting, assures the continued serviceability of the landing gear over a longer period of time. It may be well to note here that in no case should the inaccessibility of a part warrant the failure of the inspector to determine its condition. Landing gears are often covered by streamline fairings that are difficult to remove, and it has come to the author's attention that on the newer types of aircraft, there is a tendency to make all parts more accessible.

Streamline covers should be examined for cracks and repaired where necessary. Landing gear struts must show no signs of buckling or bending. Since the loads they must take are generally compression as well as tension, particular attention should be paid to this factor. Screws that secure fittings in tubing should be checked for tightness. Failures in landing gear fittings usually result from cracks that emanate from sharp bends, ends of welds, or holes that have been drilled in the face of the fitting.



Two landing gears embodying distinctly different principles of operation. Left: the Lockheed Orion. Right: the Lockheed Electra. The lifting cables and drag strut slides as well as a distinct view of the fork and shock absorbing unit are seen in the picture of the Orion landing gear. This is hydraulically operated. In the view of the Electra, the flexible brake pressure lines, retracting quadrant, shock absorbing unit, and fork arrangement may be seen.

There are a number of the newer types of landing gears that are developed along the line of the cantilever idea. These consist only of the single strut on the outside with the proper shocking arrangements in the fuselage or in a stub protruding from the side of the ship. While this gives a much cleaner design from an aerodynamic standpoint, it is likely to impair the facilities made for the inspection of the undercarriage. The condition of the shock unit is usually of great importance on this type of landing gear.

With the advent of the successful retractable landing gear, we find its use almost universal on all the newer transports. This mechanism, of course, complicates the entire system to some extent, but the manufacturers

have developed the arrangements to an extent that very little trouble is experienced. We will give a short description of all the current types in order that the problems presented the inspector may be fully realized.

Lockheed Orion

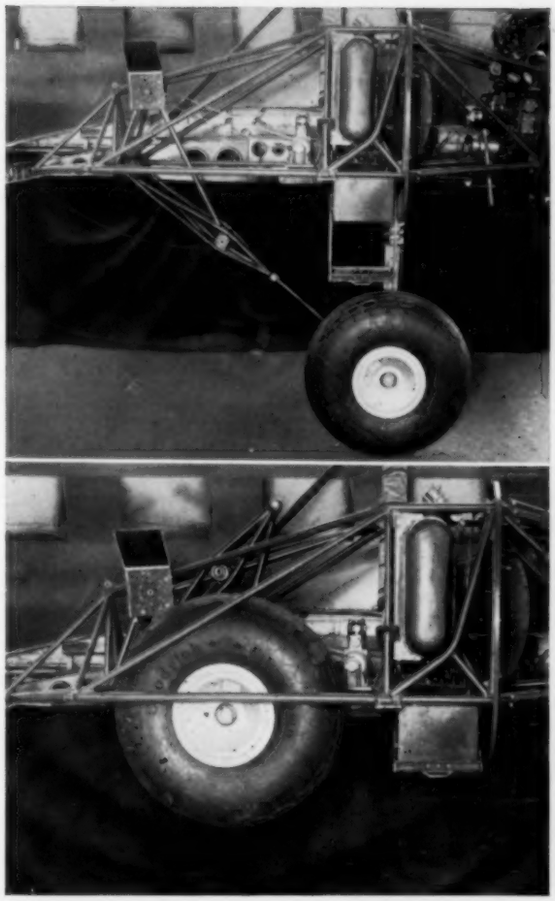
One of the earliest successful retractable landing gears was that developed by Lockheed for use on the Orion transport. This system depends on an arrangement of hydraulic cylinders for operation. In the tip of the right wing is a cylinder and piston. The piston is attached to a cable which passes through a system of pulleys, divides into two separate cables and terminates at the two forks of the landing gear. When the retracting pump in the cockpit is actuated, oil under pressure is pumped to this cylinder in addition to another one in the center of the fuselage at the bottom of the rear spar. These two cylinders lift the landing gear into the well in the wing, and retract the drag strut up along a slide parallel to the rear spar.

It is essential in a system of this type that all lines be free from leaks. It is of course impossible to determine the accuracy of operation of the landing gear without operating the gear with the wheels free from the ground. This is the chief item in the inspection of a retractable landing gear. The operation of the signals, the smoothness and ease of operation of the retracting mechanism, and the amount of slack and looseness that has developed in the system should be noted. The hydraulic reserve oil supply must be filled with the wheels down. The wheel locks for both the up and the down positions must be positive in both the release and the lock positions and the signal switches, which are carried on these locks, clean and free to move.

The wheels should lock together and release together. The streamline cover fairing sometimes prevents the wheels from locking, and it is necessary to bend it down to facilitate the accurate operation of the gear. The cable guides on pulleys is of extreme importance, since a cable binding in a pulley can very easily cause the landing gear to be inoperative. Tires on this landing gear should be kept in perfect condition. since it can cause quite a lot of difficulty to land one of the ships with one tire flat. Ball and socket joints should be well lubricated and the slide for the inner drag strut cleaned and greased. Because of the location of these parts, the grease collects quite a lot of dirt and rocks. If these parts are greased they should be cleaned quite often, to prevent gumming up and wear.

Lockheed Electra

One of the newest and most interesting of the new transport landing gears is that in use on the new Lockheed Electra. The structure is as sturdy and as simple as it can be made, and reference to the illustration will indicate the apparent method of operation. Attached to the main support member is a toothed quadrant, which meshes with a gear driven by an electric motor in the wing. Retraction of the undercarriage is achieved by the simple operation of the motor which turns the gear meshing with the quadrant, drawing the landing gear into the wing. The well is closed by fairings attached to the front of the landing gear fork. The oleo shock unit can be plainly seen extending from the bottom of the quadrant downward. Hydraulic brakes of the multiple disc type are employed. This consists of a number of discs, half of which are



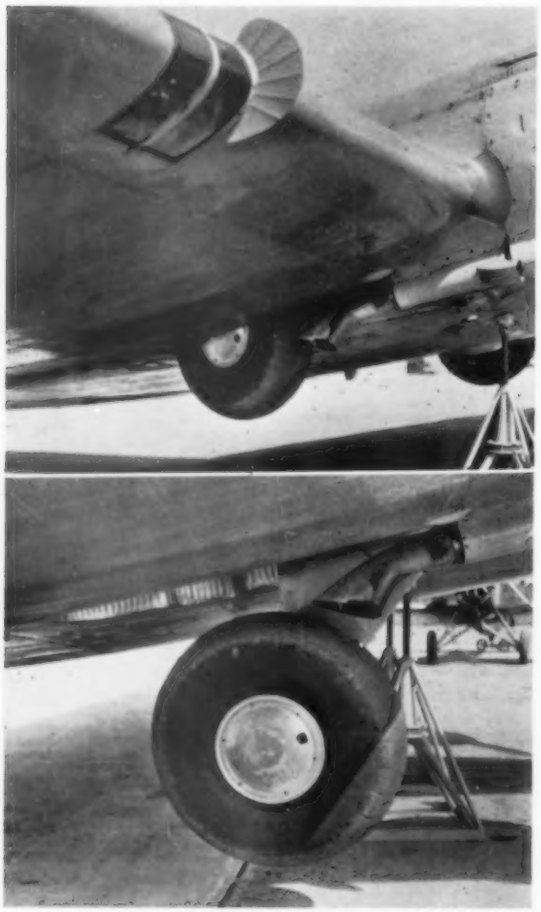
The Curtiss-Wright Condor landing gear retracted and extended. These pictures afford an excellent view of the retracting mechanism as well as an unusual view of the clean-cut motor installation. Close examination will disclose the operating motor and chain, retracting screw, signal devices and the drag strut which breaks in the middle to retract the wheel.

secured to the wheel hub and the other half fastened to the stationary structure. Action is secured by the extending of an annular piston in the wheel hub against the discs, giving braking action depending on the pressure applied on the pedal in the cockpit. Inspection of this landing gear would correspond closely with the procedure for the inspection of other types of retractable landing gears. The main essentials are the determination of positive action with the accurate functioning of the equipment. Some of the newer ships having retractable landing gears have, in addition, a retracting tail wheel assembly. These systems are usually operated by cables attached to the main landing gear in such a manner that the retracting actions take place simultaneously without the necessity of two separate systems. These should also be the object of the inspector's observations during the period of inspection of the main landing gear.

Condor Landing Gear

Another distinctive landing gear is that developed for use on the new Curtiss Condor transports. Unlike the Orion, this landing gear retracts to the rear and upward into the streamline behind the engine nacelle. The weight of the ship is carried by a conventional oleo shock strut and the taxiing loads are carried by

a heavy coil spring, both of which are clearly shown in the accompanying illustration. The landing gear is supported to the rear by a heavy strut which is hinged in the center, and breaks up into the engine nacelle to retract the landing gear. All moving parts are carried on ball bearings, and the action is very smooth and positive. Close observation of the picture will disclose the following process in the retracting of the undercarriage. Through the center of the hinged strut is a long steel screw, which passes through a retainer carried at the point of break of the strut. This screw is rotated from the end fixed in the nacelle structure, and as the rotation takes place, folds or unfolds the strut, depending on the direction of rotation. This in turn retracts the entire landing gear back into the well provided in the nacelle. The screw is rotated by a chain driven by an electric motor. This electric motor is automatically controlled by a system of electric switches carried in a box on the side of screw gear box. When in service, the entire system is covered by aluminum cover plates. In the process of inspection, these covers must be removed for the complete examination of the entire system. With the ship suspended in air by jacks, the landing gear should be operated and the functioning of the various components noted.



The undercarriage of the Boeing 247. The wheels are retracted electrically into the well in the wing. Simplicity is a feature of this arrangement.

All moving parts must be free from excess wear and should be properly lubricated. Wheels should be removed and inspected as previously noted. The value of tight connections and well conditioned wiring in the electrical system cannot be overemphasized, since the entire system is electrically operated and automatic. The auxiliary manual means of retracting and lowering the landing gear is also of importance, and the inspector should determine that part of the system is operative. It is essential of course, that the entire structure be examined for cracks or evidence of failure of parts. Bolts and pins must be free from wear. It should be noted here that in the case of the necessity of changing bolts or pins in the aircraft structure, assurance should be made that the part replaced is of the same material and treatment as the one removed.

Boeing

Another retractable landing gear of definite note is the one used on the new Boeing transport. The reliability and strength of the Boeing landing gear is a proven factor. Simplicity in operation is one of the greatest benefits of this system, and the clean design is apparent from the accompanying photos. This entire landing gear hinges at the front and swings back and up into the wing behind the engine when the retracting action takes place. The vertical support member is made in the form of a triangle, with the wheel at one corner of the figure, the hinging point at another and the point of attachment of the retracting unit at the other. Removal of the wheel for inspection is easily accomplished since the axle is of the conventional type used on stationary gears.

Douglas

One of the newest modern airliners with a distinctive and highly interesting landing gear is the Douglas Luxury Airliner. This ship is equipped with a landing gear that retracts back behind the engines, leaving only the bottom of the tire protruding. One unusual feature of the undercarriage is the use of a double shock unit on each wheel. These units, however are of the conventional oleo type, and may be easily discerned in the pictures. The method of retracting is electrical with automatic stops for the gear when it is fully retracted. The landing gear is braced to the rear by a forked drag strut secured to a fitting in the rear of the wheel recess. As the main support truss is folded forward in the center, this forked strut retracts the wheel up into the recess.

Vultee

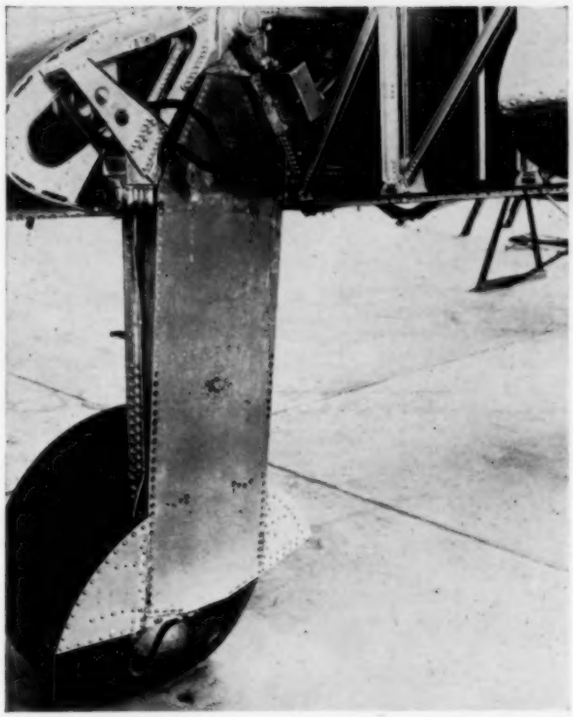
In the single motored class of transports, the Vultee retractable landing gear presents an interesting study. The vertical support strut is a built up dural member bolted and riveted together. The wheel is carried on an axle protruding inward from the bottom of the strut. Especial attention might be called to the sturdiness of the structure of this strut and also to that of the portion of the wing supporting the upper end of the strut. It is evident from the photo, that the entire strut is hinged about a single pivot point, supported on bearings carried by structural components riveted and bolted directly to the wing structure. The signal control box may also be plainly seen in the photograph. This landing gear retracts completely as does the tail

wheel, which is operated by the means of cables. The entire operation is accomplished by the means of electric motors, and the landing gear is stopped automatically when it is fully retracted. Particular attention may be called to the means afforded her for the inspection of the important points of the structure of the undercarriage. The leading edge of the wing is removable and the entire system is open for examination. Availability of parts for inspection is a feature that is typical throughout the entire structure of the Vultee.

The retractable landing gear of the Douglas Transport showing the undercarriage extended and retracted. Note the use of two shock absorbing units instead of the usual one.

Summary

As a conclusion to this phase of the inspection, we will review some of the essentials that must be noted in the inspection of a landing gear. If the gear is one of the retracting type, the ship must first be supported clear of the ground to that the system may be operated and its various characteristics noted. All signal lights, sirens, horns or other sound devices must function at the proper time and without hesitation. The entire electrical system to the landing gear motors and signals must be in perfect condition. Especial attention should



The Vultee retractable landing gear with leading edge cover removed from wing for inspection. This photograph clearly shows the hydraulic brake pressure lines, the cantilever support member, the signal devices, and the bearings and pivot tube about which the entire strut moves.

be paid connections fastened by screwing a nut down against a copper lug, to ascertain that the nut is tight. The mechanism must be free from dirt and lubricated in the proper places. The shock struts filled with the proper fluid and the wheels removed, inspected and lubricated. Locks must function at the proper time and release without necessity of exaggerated urging. The throttle should be operated to determine that any signal devices or safety mechanisms attached function as they should. All pulleys throughout the system must rotate freely and cable guides should fit closely enough to the pulleys that there is no danger of the cable coming out of the groove. All fittings, rivets, bolts, and structural members should be tested for looseness and for cracks. The landing gear should be operated several times to be certain that the operation is smooth and positive.

Stationary landing gears require the same care and attention as the retracting type, except that the mechanism is not quite so complicated. The ship should be hoisted to remove the entire weight from the landing gear, and the wheels moved back and forth to determine the extent that slack has developed in the fittings and bolts. Any bolt or fitting that shows evidence of being questionable should be removed and examined more closely. Evidence of excessive wear warrants the replacement of the part. The wheels and brakes should be serviced as previously noted.

It has been definitely demonstrated that a landing gear regularly serviced and inspected in this manner is the source of very little trouble. It is an excellent idea to utilize the regular inspection forms in this routine as has been suggested before in recommendations on inspection.

"Not Too Technical"

WINGS: FUNDAMENTAL PRINCIPLES

BY GEORGE CARROLL

THE DISCUSSION LAST MONTH was devoted to a broad consideration of airflow about wings and the fundamental principles of design and physical qualities that produced the necessary lifting power. It will be remembered how reduced pressure areas built up on the top surface of wings travelling through the air, and how a corresponding compressed pressure area developed beneath the wing and produced the lifting force. It will also be remembered how wings of thick design produced lifting power and how speed enters into the function of wings of thin design.

In our further discussion of wings and the fundamental principles involved, we must consider separately the airflow about the wings of monoplanes and the wings of biplanes—those aircraft that utilize one and two wings respectively and which are the most universally used structures in present day aircraft. We must also take into consideration a peculiar condition that exists at the wing tips of an airplane in flight—a study of the airflow about wing tips of various designs and the *why* of "tip vortices," or air currents that set up around the outward tips of the wings.

Biplanes

In the early stages of aircraft development, the biplane was almost universally used and is even now used extensively. Figure 1 illustrates a cross section view of biplane structure which is passing through the air at sufficient speed to produce lift. It is important to notice how the lower wing is set considerably behind the upper wing in order that the reduced pressure area on the lower wing does not interfere greatly with the compressed area on the upper wing. In other words, the wings are "staggered." It is easy to understand that should the wings be placed directly above and below one another and not staggered, the two distinct pressure areas thus overlapping would result in a great loss of efficiency and possibly prohibit the *desired* lifting force. Staggering therefore eliminates most of this possible interference or over-lapping of the two opposing pressure areas and permits the airflow between the wings to produce and maintain the desired condition.

Proper spacing between the wings is also a necessary element in the structural design, and reduces the interference to a minimum with maximum compactness and efficiency. This spacing of the wings one above the other is called the "gap chord ratio"—the ratio of the gap distance between the wings to the chord or lateral width of the wing.

Monoplanes

In craft utilizing monoplane structure, it is evident that interplane interference characterized in biplane

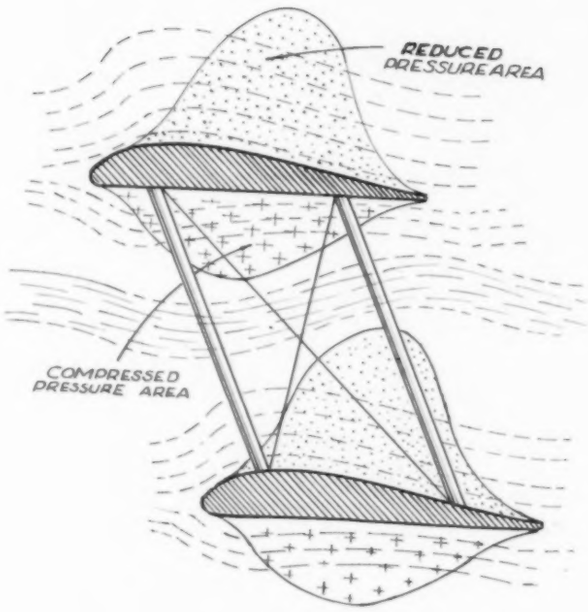


FIG. 1

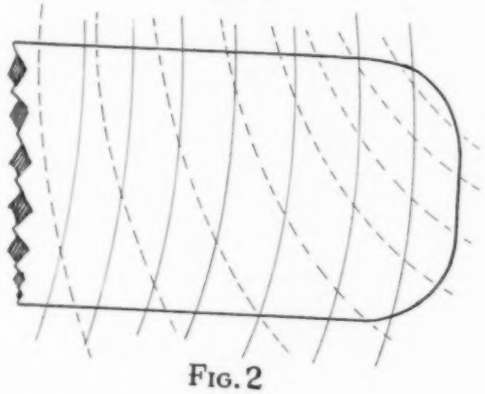


FIG. 2

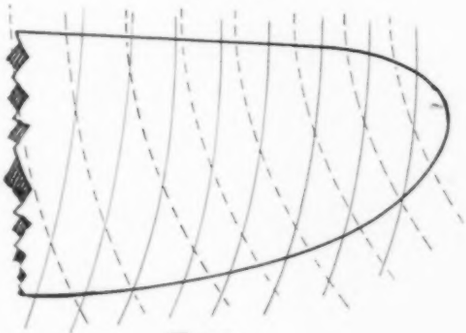


FIG. 3

structure is non-existent. The monoplane utilizes *all* the lifting force produced by the wing. It is evident also that in monoplane structure there is a need for relatively greater wing span in order to achieve the proper amount of lifting surface.

Tip Vortices

There is one loss of efficiency that is attendant to both monoplane and biplane structures. This loss takes place in the tip area of the wings. It is known as "tip loss" and arises from "tip vortices.' Illustrated in Figure 2 we see the lines of airflow above and below the wing's surfaces. The dotted lines of airflow designate the flow of air on the under surface and the solid lines designate the flow of air on the top surface.

On the under side of the wing surface, the airflow is disrupted near the wing tips by the tendency of the air to "slip" off, so to speak, and be forced from under the wing in its attempt to enter the reduced pressure area on the top surface of the wing. This condition sets up whirling motions in the airstream known as tip vortices. Further, it is evident that two such conditions exist in the case of the monoplane—one at each wing tip, and four in the case of the biplane. In the latter structure, the tip vortices of upper and lower wings overlap to a certain degree and this inter-disturbance destroys a certain amount of lift. Figure 2 shows the old conventional type of wing with an especially wide but slightly rounded tip.

Tapered Wings

Figure 3 shows the tip of modern wing design. Here also the dotted lines designate the flow of air above the wing. The air, when forced to flow diagonally across the wing as it does near the center of the wing, thereby producing approximately the same chord as in the case of the air flowing straight across the center section of the wing. In figure 2, the air flowing across the old style wing tip travels a greater distance because of the greater diagonal distance, since the wing is not tapered. The greater chord area will destroy more of the lift than the wing designed in Figure 3 which has the tapered wing tip. Also, the vortices about the tip are greater in the old design than in the new. Thus, the tip vortex is reduced to a minimum by tapering the wing, inasmuch as a minimum amount of the air "spills" out, so to speak, from the under side.

Ever since the extensive use of airplanes, there has been a great amount of difference of opinion as to the respective excellencies of biplanes and monoplanes. We leave the reader with an open mind to accept *both* types as having utility and an efficient and definite purpose in aviation. Of course it is evident that in the case of the biplane great wing spans are not necessary, and by the compactness of the wing structure the craft can be stored in a smaller space and that wing bracing is easier inasmuch as the use of heavy struts is not necessary. The important point is that both monoplane and biplane structures are extensively used, and a complete knowledge of both types is necessary for a thorough understanding of aerodynamics.

NOMENCLATURE—Part 2

By W. A. Hotmann

IN THIS MONTH'S ARTICLE we shall complete the structural nomenclature of the airplane. Our next step will be to take up the most common type of body which goes by the name *fuselage*, a term borrowed directly from the French. In order to come properly within that class, the body must serve as a connecting member between the wings and the tail surfaces and also provide a space for housing part or all of the crew, or for some part of the airplane power plant. A structure so slender that it serves merely as a support for the tail should be rightly termed as a *tail boom*. When the body is designed to accomodate the crew or a power plant, and does not extend to the tail members, it is called a *nacelle* and cannot be termed a fuselage.

The portion of the structure which embodies the wheels, or skids, is called the *landing gear*, or as our British brothers term it, the *undercarriage*. The term *chassis*, also, is sometimes used in the same sense. The supporting member at the tail section, whether it is a wheel, skid, ski, or float forms the *landing gear*. The commonest type of landing gear consists of two wheels and a tail skid. Other skids are often used to protect other parts of the plane from injury in a bad landing, notably near the tips of the wings; this type of support to the structure is more often employed in the seaplane than any other type. These additional skids are not included as parts of the landing gear, as they are designed to come in contact with the ground or the water under abnormal conditions.

When an airplane bases its operation on the water instead of on the land, the landing gear is replaced by a *float* or *hull*, the former term being used for a closed structure having no other function other than to supply buoyancy, while the latter applies to a more elaborate flotation member accomodating the crew and combining the functions of a landing gear with those of a fuselage or nacelle.

In the case of the amphibian, a wheel landing gear and a float or hull as well must be fitted. There is, however, an intermediate class of devices known as *flotation gears* which are used on land planes forced to fly over water. The object of a flotation gear is to make it possible for the craft to remain afloat after a forced landing, but not to permit the machine to take off from the water.

Considering the control surfaces first, there are three in number, designed to produce rotation of the airplane about its three axes. The *elevator* (sometimes there are two or more and often spoken of as the *flippers*) is a surface which is normally horizontal, and which can be rotated at will by the pilot about a horizontal axis perpendicular to the line f flight. The elevator is ordinarily placed at the rear of the machine as a part of the tail assembly, but it may be at the front, well forward of the wings, without losing its identity or changing its name At one time airplanes with the elevator in that position were common, but now they are obsolete. They are classed together as of

canard type from the fancied resemblance of a duck in flight.

The *rudder* fulfills a function corresponding to that of the elevator and is mounted in much the same way, but rotating the ship about a vertical axis to steer the ship to the right or left. It, too, may be placed at the front instead of the rear, but such a location is even more rare than the elevator in that position.

Finally, the third control is furnished by the *ailerons*, auxiliary surfaces attached to the trailing edge of the wings at the tips, or as near the tips as the structural strength will permit. They are fixed so that they rotate about a transverse axis parallel to that on which the elevators turn, and the object is, by turning the ailerons on the two sides oppositely, to increase the lift on one side and decrease that on the other so as to cause the airplane to roll. In occasional instances the ailerons are mounted independently and between the wings of a biplane, and are then described as *interplane ailerons*. The first airplanes had an arrangement of the wing structure so that the wings themselves could be warped at the tips to produce the same function as the ailerons; however this is not favored now, due to the loss of structural rigidity involved.

The stabilizing surfaces are various in number and in arrangement on different types of planes, but a few types nearly always appear. The first and most important is the *horizontal stabilizer* or *tailplane* and is a fixed surface, and as the name describes, horizontal and forming a part of the tail. The elevator is, in most cases, hinged directly to the stabilizer at the rear. In a few cases the stabilizer has been entirely eliminated, the entire horizontal surface being made moveable and serving as the elevators.

All other stabilizers are generally described as *fins*. When that term is used without the qualifying adjective, it refers to the vertical stabilizer which bears the same relation to the rudder that the horizontal stabilizer does to the elevators, being a fixed vertical surface to which the rudder is hinged. The complete omission of the fin is more common than that of the horizontal stabilizer. There are all sorts of special fins; any small surface designed to assist in stabilizing, bears the name *fin*. The most common are *skid fins*, which lie in a vertical plane parallel to the line of flight at intervals along the upper surface of the wing.

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Russians Study U. S. Aviation

A study of air transport operations in the United States was made in June by three engineers of the Research Institute of Aviation Engineering of the Aero Fleet of U. S. S. R., with a view toward application of American methods to development of air transportation in Russia.

A. Vissman, P. Davidov and D. Moscov comprised members of the inspection group who traveled over United Air Lines' coast-to-coast route from New York to San Francisco, inspecting equipment and operating methods.

The Fourth Airways District

(Continued from Page 7)

sary to keep a District tractor crew constantly patroling the fields, grading and dragging washes and leveling sand drifts.

Many of the fields were established in the Fourth District before there was sufficient air travel to warrant the establishment of lighted airports by the smaller cities along the airways. Several of the far-sighted communities co-operated with the Bureau of Air Commerce in the establishment of intermediate landing fields with the view of later taking these fields over as airports. This cooperation was given in acquiring the necessary land and performing as much conditioning work thereon as their funds would permit at the time. The Bureau of Air Commerce completed the job and operates them as regular intermediate landing fields. During the operation by the Government they cannot, under the provisions of the law, be used as commercial airports. Recently, several towns in the District have cashed in on their foresight and have taken over the operation of these fields as regular airports. The Government lighting equipment has been licensed to them at a nominal sum with the proviso that the lights and equipment be operated in accordance with Bureau of Air Commerce practice and standards.

The Tractor Crew

The tractor crew is composed of a general mechanic, two tractor operators and a laborer; additional laborers are picked up at the fields if and when required. A "twenty cat" with wide crawler treads is used to pull the graders, levelers, fresnoes, etc. This equipment is transported from field to field in a five-ton truck accompanied by a light delivery truck which is used for hauling supplies. The crew camps at the field being repaired and works two 8-hour shifts a day.

The Paint Crew

Airways equipment such as towers, buildings, boundary cones and day markers require painting every two or three years depending on the climate. This work is accomplished by a District paint crew, consisting of three painters. A two-ton panel body truck transports the necessary paint, ladders and other gear required for the job. This outfit, like the tractor crew, also camps at the site where working. Luckily the climate in the northern and southern sections of the District is such that the crew can work the year round, by covering the northern section in the summer and the southern section in the winter.

After considerable experimental work a color scheme of alternate white and international orange bands has been adopted as the standard Bureau of Air Commerce color scheme for airways towers and lighting structures. It has been found that this scheme is most readily picked up from the air.

Use of Aids

The various Air Navigation Aids are provided for the use of the flying public in general and the same service is rendered to student cross-country fliers and the large transport mail and passenger planes without cost.

Ports of Call

Beaumont, Texas

Local pilots are glad to notice a number of improvements at the Municipal Airport. We hope that FRANK BERTSCHLER, Park Superintendent and Mr. LAVENDER, new field manager, will keep up the good work. New windsocks were installed, a bad ditch filled up, grass cut and a phone installed in the hangar.

The States monoplane, made at Center, Texas, visited Beaumont as its first stop outside the factory, this past month. From all indications it seems that this will be a very popular plane in this section.

We Knew Him When! A. O. RUSSELL, recent winner of $75,000 in the sweepstakes, was a frequent visitor to the Wing Over Club while based here on a photographic mission for Fairchild Aerial Surveys. Quite a surprise to the bunch to see "Russ' in the newsreel. Hurry back, Russ.

The Wing Over Club held the annual election on June 7th. Officers elected for the coming year were:

LARRY J. FISHER, President (re-elected)

JIMMY MARSHALL, Vice President

BURTON HOLTON, Secretary-Treasurer.

Holton, incidentally, has held all three offices in the club.

Board of Directors elected were:

LUTHER CARUTHERS, B. FRANK EDGAR, RALPH HALL, O. K. HARGROVES and WILEY SULLIVAN.

The club hopes to go places this year and the membership will certainly back the officers in "putting the club on the map."

RALPH HALL, B. H. CARROLL, HERBERT PEAVY, W. M. SISK, BOB THOMAS, JOE GREGG, E. A. WEST and D. R. WATSON were initiated June 21.

The initiation committee was composed of JIMMY MARSHALL, chairman; L. B. MATTHEWS, LUTHER CARUTHERS, O. K. HARGRAVES and DOROTHY MORROGH.

The reception committee: IRMA CLARK, HELEN JOHNSON LOIS NEEL and WIER MERCHANT.

Sergeant at Arms: ANDY GIBSON.

Eats and Airport Arrangements: WILEY SULLIVAN, ODY TURNER, ELLSWORTH SIMS and PETE STUART.

Airoprt welcome committee: MAX LEON, ELLSWORTH SIMS.

Sponsors for the candidates: JOHNNY WALKER, W. N. VICKERS, JR., JACK SHELL, LESTER HANKAMER, JOE DELAUNE, FRED ACKERMAN and BURTON HOLTON.

Following the initiation, a barbecue and dance were held at the airport. Invitations were issued to the following out-of-town guests: E. E. ELAM, General Manager, Shushan Airport, New Orleans; DR. J. D. BROCK, Aeronautical Inspector, Department of Commerce; FRANCIS MACDONALD, Fairchild Sales, Houston, JIMMY WEDELL, Patterson, La.; GEORGE E. HADDAWAY, Editor *Southwestern* AVIATION; JACK BERETTA, Texas Gov., Sportsmen Pilots Assn., San Antonio; MAJOR M. F. HARMON, Commanding Officer, Barksdale Field, Shreveport; and several local aviation enthusiasts.

The Wing Over Club saw another member off to foreign parts this week. FLOYD ADDISON, who has been in Bogota, Colobmia, South America, with the Servicio Aero Colombiano Airline.

Floyd came back to the States for ships and the Mrs. He flew a Curtiss bi-motor Kinbird back, going by way of Brownsville, Mexico City, Cristobal, and on to South America.

With him went the first club pin to be issued. This pin, in enameled sterling silver is a miniature of the club insignia, and was designed by one of the members, BERNARD TENDLER.

Chanute, Kansas

EARL SMITH and wife, who have been wintering in Monterey and the lower Rio Grande Valley spent a few days in Chanute enroute to Chicago and the World's Fair. While here Mr. Smith traded his Travel Air to MR. DICKERHOOF for the Barling NB3. Dick obtained the Barling from GLEN MCCONNELL of Humboldt. The boys at the field enjoyed the tales of flying in Mexico as related by Mr. Smith.

JACK CRAWFORD of Wichita, FRED BRADLEY, HAROLD MAXWELL and O. E. DICKERHOOF did some profitable barnstorming last month. One of the most interesting and novel passengers was a seventy year old "youngster' at Galesburg, Kansas. Aviation gained a new booster in this man.

Frequent visitors at the Chanute field are CLARK STEVENS and RAYWOND LAHER, of Neodesha. Steve and Ray have their own hangar on Hobson Field at Neody and fly an Inland Sport, Le Blond powered. The mighty fine boys are building up quite a few of those coveted hours in the pleasure jaunts around over the country.

JACK JULIAN of Neodesha, a protege of RAYMOND HEDRICK who formerly operated the Neodesha Flying School, is visiting MRS. JULIAN and their parents at Neodesha. Jack is flying for an airline in South America and is back in the States on company business.

DR. JOHNSON of the Johnson Hospital in Chanute made an emergency trip to Tulsa last week, making the trip in a Warner Cessna piloted by Dick. The doctor is one of our most ardent boosters, posesses a solo license and has owned several planes. At present his work keeps him pretty busy but he makes an occasional trip for pleasure and practically all his business contacts by plane.

GEORGE BAGLEY, who works for the Santa Fe is rapidly completing the job of rebuilding his OX Robin which he purchased from Dick in a knock down form. He is doing the finishing after work hours and week ends. We hope soon to see him and his up in the smoke-free ozone. The work is being "supered" by Dick.

The Velie Monocoupe owned by WALLACE HANSON is being overhauled by Dick previous to the annual

inspection. The trim black and red little craft affords Hanson many hours of pleasure.

MERLE K. SMITH, former assistant to Dick is now operating a school and carter service at Winfield, Kansas. He is now operating a Waco and a Travel Air. Together with some of his former students we have been informed that he is doing quite a bit of barnstorming as The Flying Devils. Let's hope he doesn't lose the cowling from his Travel Air again.

STEVE SINKLER, who has been on night duty at the local airport has deserted us and is now located at Wichita. Drop us a line, Steve, old boy.

ROLLO INMAN dropped in flying the O. C. S. Spartan cabin job and tells us that his brother DON has gone to Pittsburgh, Pa. for a Ford Tri-motor. The Inman brothers hail from the Coffeyville "muni" port.

Hot Springs, Ark.

Uncle Sam's great American spa—Hot Springs National Park, Arkansas, the oldest of the 22 federal owned parks—has gone airminded.

This statement is based on the fact that over 300 of the leading citizens of the community turned out for the annual Chamber of Commerce supper membership meeting, which was held in the hangar of the airport. Preceding the Chamber's formal program, supper was served picnic fashion in front of the hangar, while the civic leaders were entertained by stunt flyers.

The keynote of the meeting was aviation.

The purpose of selecting this novel setting for an annual Chamber of Commerce mebership meeting, it was explained by the retiring president, E. L. HOWLETT, was to acquaint the citizens first hand with the improvements that had been made at the airport to bring it up to standard and to make the people of the community more airminded.

The principal improvements included an extension of 700 feet to the 1,800 foot east and west runways; 400 feet to the 2,500 foot north and south runways; enlarging the hangar from a three plane capacity to accomodate 18 planes; painting all boundary fences; installing and painting standard markers; draining and levelling the field.

The Hot Springs project was one of many started in Arkansas some time ago under the regime of the CWA of which Charles Taylor of Little Rock was director for the State.

Mr. Taylor stated that the Hot Springs was the first in the state to be completed. A. F. ANNEN was the resident engineer in charge of the work.

JOHN STOVER, manager of the airport makes his home on the field.

For the benefit of those who were not familiar with the advancement of aviation, SCOTT D. HAMILTON, manager of the Hot Springs Chamber of Commerce, with the cooperation of Lieut.-Col. WILLIAM DENTON, commandant of the Army and Navy General Hospital was successful in securing a large army ambulance plane to make the trip from Barksdale Field, Shreveport, Louisiana for exhibition purposes. Large passenger and photographic ships were also exhibited. Major W. S. WOOLFORD, surgeon, was in charge of the hospital ship, which was piloted by Lieut. S. C. DUNLAP. NEWMAN WADLOW of Wichita, Kansas was at the controls of the aerial photographic plane which is capable of climbing 23,000 feet in 30 minutes. This plane was fitted with oxygen tanks. Mr. Wadlow was here with GLEN SMITH of the Bowman-Park Aero Company, Louisville, Kentucky and was making a photographic map of the one million five hundred thousand acre Ouachita National Forest.

CHARLIE TAYLOR, who probably rates as Arkansas' most active volunteer in aeronautic promotion in his state was a guest of honor.

Kilgore, Texas

An elaborate Air Show will take place on Elder's Field on July Fourth. The field built by TIGE FLOWERS and BARNEY HAYGOOD in 1931 is now operated and maintained by the Kilgore Chamber of Commerce. The last air show was officially dedicated last October with the founders and MAY and JIMMIE HAIZLIP as guests of the day. Twenty thousand people visited this last event.

The July show will be held under the sponsorship of the committee composed of DR. MELVIN S. BECK, DR. C. J. CONNOR, J. B. NEHLS and BARNEY HAYGOOD. Many major and independent oil companies are sending ships, with many notable pilots as guests of the day. A series of entertainments for visiting flyers has been arranged.

The airport will be open to barnstormers provided single-motored craft is used.

Marshall, Mo.

BEN GREGORY of Kansas City has been barnstorming over Missouri lately and has enjoyed the best business in years. He flew 300 passengers on night flights in Booneville during one week end in May. He utilized his Ford Trimotor.

SWANSON'S and FAHLION'S new plane of cantilever construction is causing quite a stir about Marshall. It is a two place tandem cabin monoplane and powered with a geared English Pobjoy motor of about 80 horsepower. On recent flights they have gained a top speed of 135 miles per hour and a landing speed of 40 miles per hour. The plane takes off under load in six seconds and climbs 1,450 feet the first minute. Gasoline consumption is reported to be 4 gallons per hour, oil at one and a half pints per hour.

New Orleans, La.

The Eastern Air Lines and the Pacific Seaboard Air Lines, successful air mail contractors have recently inaugurated regular mail and passenger service out of New Orleans to Atlanta and the East and to Chicago, respectively. Traffic is substantially increasing.

The repair shop, recently equipped at Shushan Airport, has been given an approved rating by the Department of Commerce. An extensive repair business is being enjoyed both to private and commercial equipment.

E. R. A. work on the landing field at Shushan has been resumed and an A. T. A. rating from the Department of Commerce is expected within the next thirty days.

Storage rates have been revised. Considerable reductions have been made in every instance which are

to take effect July 1st. Student and sportsman owners have been separated from the regular transients and have been given the benefit of exceedingly low rates. The local commercial operators will be limited to a number that business can economically support and the general type of equipment will be specified and approved by the Airport manager.

San Antonio, Texas

HECTOR BILLA is believed to be the only one-handed flyer in this section of the country.

He lost his right hand at the wrist in an explosion at the age of 12, and was granted a waiver by the Bureau of Air Commerce, Department of Commerce. Billa, taught to fly by AL TURPE at Winburn Field, uses a strap and a hook to assist him in manipulation of the controls. He made his first solo flight in June.

CARL WALLRATH, San Antonio bookkeeper, was granted a private pilot's license. NG LEE, Chinese grocer, also made his first solo flight. All are students of Turpe, who bases at Hangar 6, Winburn Field.

VERNON T. MCGUYRE, who was a pilot with the old Southern Airways at Winburn Field in 1932, was killed recently in Honduras when his plane cracked up after being forced down in a storm.

Mac learned to fly at Kelly Field during the World War. He used to lay claim to some of those ditches dug in old Kelly in learning what constituted a good landing and what didn't. We remember one trip in particular, when he landed back here from Chicago and had encountered a bad storm. Shifting his ever-present chaw of terbaccer to another position, he said: "My hair didn't turn white 'cause it cain't—it's red!"

JACK BERETTA, San Antonio sportsman-pilot and Texas' governor for the National Aeronautical Association, is on a flying (airline) business and pleasure trip to New York, Philadelphia, Wilmington, Delaware, and Washington, D. C.

He is visiting at Wilmington with HANK DUPONT, who is married to the former MARGARET LEWIS of San Antonio. Beretta and DuPont were college chums together. DuPont, a pilot, maintains a private flying field at Wilmington, which is the secret hideout of Colonel Lindbergh when in that section of the country.

St. Louis, Mo.

The Young Men's Division's Aviation Committee sponsored the 1934 Model Airplane Races June 17th at Parks Air Port. Eighteen cups were awarded to the various winners, and the two high winners received free trips to the National contests at Akron. Over one hundred entries in the contest, some with flying models that would fly great distances. Entertainments and various other contests were held throughout the day.

Service on the Chicago-St. Louis-New Orleans Air Mail route was started on June 3. The route is being operated by the Pacific Seaboard Airlines, Inc. The morning plane out of Chicago at 8:15 arrives in St. Louis at 11:05 and departs for Memphis, Jackson and New Orleans at 11:20, arriving New Orleans at 6:05. The northbound plane departs from New Orleans at 10:20 a. m. and arrives in St. Louis at 5:15 p. m. and at Chicago at 8:30 p. m.

A new record flight from Fort Worth and Dallas to St. Louis recently was made by the American Airlines "Vultee" which made the trip in 2 hours and 52 minutes. The distance was 630 miles and was made at an average speed of 220 miles per hour. The new transports will be placed in service by American Airlines over this route as soon as full delivery is made by the Airplane Development Corporation.

The St. Louis Flying Service is enjoying increased business of late. At the present time forty students are enrolled in the flying school.

Dallas, Texas

Bowen Airlines have leased the former United Airlines terminal at the north end of Love Field. The new accomodations which are second to none in this section will more adequately take care of the ground personnel and the increased passenger and express business.

Burrell Tibbs, who led the recent Oklahoma Aerocade, was a recent visitor to Love Field as pilot of the Black Gold Refinery's Travel Air with company personnel.

O. B. Callan, formerly with the WACO factory at Troy, Ohio, is now connected with Edward F. Booth, Inc., of Dallas.

Bill Welborn, president of the Tulsa Aviation Club recently flew to Dallas for a brief visit in J. H. Maybee's Wasp powered Orion.

Strangler Lewis, former holder of the world's heavy weight wrestling crown and inveterate air traveler, has bbeen flying over the Southwest fulfilling wrestling engagements. Of late he has been flying in and out of Dallas via Bowen Air Lines.

Waco, Texas

Cadets from Randolph Field swooped down on the Waco Municipal Airport during June. Eight cross country flights were made to Waco preparatory to the four months training period at Kelly field.

HARRY HOWZE paid us a visit in the new Waco Wright powered cabin plane recently purchased by the Humble Company. Harry was on his way to Midland with three officials of the company.

DEES MCDERMOTT, operator of the airport, has been flying the prop off his Stinson lately, making all the golf tournaments now in progress over the state.

DOC BOOTH, hard working Waco distributor from Dallas dropped in for a visit in the new Waco cabin job.

We understand that the new mail carriers on route 15, Long & Harman, Inc., are making an enviable record flying the mail. They are on time every day and have their first trip to make behind schedule.

Inspector MEADOWS spent the appointed day on the Waco airport and failed to find any fault.

DR. K. K. EASON of Abilene visited friends in Waco during June. He is flying the Stinson purchased in Fort Worth recently.

Other visitors of late are HARRY HAMMILL flying his Stinson, S. V. DANIELS of Houston, MR. and MRS. MYERS and daughter of Dallas, W. B. WHEATLEY delivering a fleetster to Pan American in Mexico.

With the Air Corps

Barksdale Field

With the return of all personnel who were on detached service with Army Air Mail Operations, activity at Barksdale Field has returned to normal routine. After reconverting all aircraft from mail planes back to tactical airplanes, all squadrons of the 20th Pursuit Group have resumed their tactical training schedules. Aerial gunnery is being performed by all the units, and formation training flights are again a daily occurence. In fact, all flight training was augmented with the recommissioning of the Boeing P-26A Pursuit planes, which had been grounded for several months until the necessary modifications in structural design could be accomplished.

Changes in the commissioned officer personnel at the Post have been numerous in the last month. Captain THOMAS BOLAND, who has been on duty with the 20th Group for several years, departed for his home at Reno, Nevada, having retired from the Army with over thirty years service to his credit. Three Captains, who were recently ordered here by war department orders, reported for duty. They are Captain OLIVER P. GOTHLIN, JR., and Captain C. F. BOND, both just having completed the courses of instruction in the Air Corps Tactical School at Maxwell Field, Ala., and Captain A. F. HEROLD, who has been on duty with the Missouri National Guard at St. Louis. Others under orders for Barksdale Field are Lieuts. F. PARKS and R. O. CORK. They are now completing courses at the Air Corps Technical School, Rantoul, Ill. Lieut. C. E. CRUMRINE at present commanding the 55th Pursuit Squadron, will soon leave for Maxwell Field, where he will be a student in the Air Corps Tactical School in the next course. Eight Reserve Officers returned to a civilian status when their tour of active duty terminated last month. They were Lieuts. L. D. CALDARA, C. DARNELL, J. L. GEBELIN, J. F. GEORGE, W. R. GRABILL, W. J. MCCRAY and R. R. VAVRINA.

The present projects under construction on the field are nearing completion. The two new group Headquarters buildings should be ready for occupancy by early fall, as should the two hangars, which are to house the 3rd Attack Group, when that unit is to be moved to this Post. The Officers Club, or Patrick Hall (named in memory of the late Lieut. Frederick I. Patrick, who lost his life in an airplane accident near Denison, Texas Feb. 22) is scheduled to be completed this summer. The swimming pool built in conjunction with the club has been finished, and will be ready for use by July 1st.

On May 26th, in a General Order, Major M. F. HARMON, JR., Commanding Officer of Barksdale Field, commended eleven enlisted men for their performance of duty incident to the recovery of the bodies of the late 1st Lieut. W. H. DOOLITTLE and 2nd Lieut. NORMAN W. SPEAKER, from the Red River. The men receiving the commendation were Corporal J. C. GROSS, Privates B. D. WADE, H. C. THORNE, C. R. HOLSTEAD, W. B. PESSEL, E. E. ALMOND, J. A. CAMPBELL, V. PALMER, E. HENDERSON, C. L. ENLOW and W. T. SMITH.

Dodd Field

The air station of the United States Coast Guard at Dodd Field is soon to get six new convertible (open and closed cockpit) Waco biplanes capable of doing close to 190 miles an hour for border patrol flying.

Lieut. C. F. EDGE, Coast Guard officer-pilot in charge of the station, has recommended to Washington that these planes be purchased, as they fit the type of flying necessary. Border Patrol planes must be fast and still be able to get in and out of small patches in combating smugglers.

Since the unit was started two years ago by the Customs service and recently transferred to the Coast Guard, confiscated planes have been rebuilt and utilized. Recently one of these planes caught fire at El Paso and in an attempted landing Harry Sexton, Collector of Customs here, was killed, and Lieutenant Edge severely burned. Since then, the ships have been grounded. This week an Army survey board condemned two of four ships.

Hensley Field

Dedication services for Hensley Field, located between Fort Worth and Dallas near Grand Prairie, Texas, were held June 30 and July 1. Aerial maneuvers utilizing attack, bombardment, pursuit and observation planes were presented by units from several Southwest army training fields. All commanding officers of Army fields in the Eighth Corps Area attended the celebration, which was exceeded in size only by the dedication services held for Randolph Field.

The dedication was held to mark the end of extensive improvements made at the port, $65,000 having been spent on barracks, run-ways, lights and roads.

Captain B. S. Thompson, who has been in the service since 1917, has arrived at Hensley Field to relieve Capt. Harry Weddington of command. Thompson will be remembered in connection with the 22,500 mile good-will Pan-American flight in 1926 and 1927 which was under his able command, and for which he received the Distinguished Flying Cross. He was an instructor in pursuit during the World War at Lake Charles, La. From there he went to Arcadia, Fla., and thence to Fort Sill, Oklahoma. Langley Field, Virginia, two years in the Phillipines and Aberdeen, Maryland. After the famous Pan-American flight, Captain Thompson was assigned to Kelly Field and subsequently to Randolph. He arrives at Hensley after a year's study at the Air Corps Tactical School in Montgomery, Alabama.

Captain Weddington, who has been in command of Hensley Field for the past seven years, will leave for the Tactical school when he is officially relieved of command on August 10th.

Four two-week training camps for student officers will open July 1st and end August 25th. The first detachment will be composed of about forty students, six instructors and eighteen enlisted men.

From Yesterday's Mail

Excerpts from Letters

Mr. P. T. Norton
Associate Editor, *Southwestern Aviation*
2025 Eye Street, N. W.
Washington, D. C.
My dear Mr. Norton:

. . . . . I have shown the magazine "*Southwestern Aviation*" to the President. He was very interested in your new project.

The President asked me to assure you of his good wishes in this undertaking . . . . . .

Very sincerely yours,
(*Signed*) STEPHEN EARLY
Assistant Secretary to the President

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Mr. George E. Haddaway, Editor
Southwestern Aviation
Fort Worth, Texas
Dear Sir:

Please accept my heartiest congratulations on your new magazine, *Southwestern Aviation*. I received my second copy this morning. It is replete with interesting and authentic facts about aviation development and I am sure it will serve a useful service to our growing region. Typographically, too, it is most attractive.

. . . . . I am particularly glad to see the sound editorial policy advanced in "Editorials and Comments."

Very sincerely yours,
(Signed) Dale Miller, Associate Editor
"The Texas Weekly"

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Southwestern Aviation
Ledger Building
Fort Worth, Texas
Attention: George E. Haddaway, Editor
Dear Mr. Haddaway:

"Vox populi vox Dei!"

I am honored for the opportunity of reading the recent issues of "*Southwestern Aviation*" and expressing my reactions from the viewpoint of an individual "in" the so-called game. I read the magazine carefully and specifically attempted to uncover phantoms and am happy to write you no servile spectres lurk between the covers of your conformable publication.

It is indefeasible that your magazine will render every phase of aviation an invaluable service. Above all, it presents a non-technical picture of the industry easily understood by those readers unfamiliar with phraseology used by the engineer and the flyers. In this connection I particularly cite the articles by Maj. W. C. Ocker and R. C. Stunkel and George Carroll. Aviation has been paraded as a technical subject far too long.

As in the opening sentence, "The voice of the people is the voice of God" you can, and are, giving aviation a voice which I am sure is the right voice. I wish you every success.

(Signed) WILLIAM FREDERICK SALATHE
Aviation Editor,
Evening News
San Antonio, Texas

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Mr. George E. Haddaway,
Editor, *Southwestern Aviation*,
Ledger Building,
Fort Worth, Texas
Dear Mr. Haddaway:

I have very carefully read every word in the June issue of *Southwestern Aviation*. I think it is one of the finest aviation magazines that I have seen up to date.

I like the optimistic attitude expressed in the articles and the soundness with which you present new, constructive programs which at first might seem a bit far-fetched but which have real possibilities. It takes this kind of comment and articles of this nature to get the lines of development which have not been touched to date.

Some weeks ago, when I was in Washington, I had the privilege of meeting Mr. P. T. Norton, Jr., of your staff and I thought him a very capable and a very energetic man, but I did not realize that your magazine was as good and as up-to-the-minute as I have found it to be.

Yours very sincerely,
(*Signed*) OLIVER L. PARKS
President, Parks Air College.

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Mr. P. T. Norton, Jr.,
Associate Editor, *Southwestern Aviation*,
The Park Lane
Washington, D. C.
Dear Mr. Norton:

I have received and read with interest and pleasure the recent issues of *Southwestern Aviation*. This publication deals with live subjects in aviation in a live way and I congratulate *Southwestern Aviation* upon its accomplishment.

I note in your columns a letter sent to me by Mr. Charles C. Curry. I received the letter from Mr. Curry and was glad to write and assure him I was interested in doing what I could to get proper action taken concerning the matters he mentioned.

With cordial good wishes for you and for *Southwestern Aviation*, I am,

Sincerely your friend,
(*Signed*) FRITZ G. LANHAM
Congressman

NEWS BRIEFS

Opening Date for Bids Extended

At the request of interested aircraft manufacturers, Eugene L. Vidal, Director of Air Commerce, has extended the date for the opening of bids for 25 small, inexpensive two-seated airplanes from July 25 to August 27.

"The requests to extend the date included two reasons," Mr. Vidal said. "One was that some of the manufacturers plan to make models and conduct thorough wind tunnel tests. The second reason advanced was that the engineering staffs of other manufacturing companies are exceedingly busy at this time.

"We therefore have granted the requests and have extended the date to August 27."

Mr. Vidal, on May 26, called for bids for the 25 planes which will be used by the aeronautical inspectors of the Bureau of Air Commerce in connection with their work in the field. The Department's specifications embody advanced characteristics in design, construction and performance.

Vice-President Roosevelt

Thomas A. Morgan, president of the Aeronautical Chamber of Commerce of America, Inc., announced on June 14th the election of Elliot Roosevelt as vice president of the Chamber. Mr. Morgan said the election of Mr. Roosevelt is in line with the policy of the organization to serve more effectively the whole industry. He stated that Mr. Roosevelt is a trained aviator and thorough student of aviation, and will devote his full time and attention to all problems that relate to every phase of the industry. His election was unanimous and highly approved in all directions.

Lockheed Sales in Southwest

Continental Oil Company of Ponca City, Okla., is the second oil company to place an order for a Lockheed Electra, according to Carl B. Squier, vice-president of the Lockheed Aircraft Corporation, Burbank, Calif. The bi-motor Electra, powered with two Wasp Juniors, will be used for executive transportation throughout the United States, Mexico and Canada. Henry A. Frese, head of the oil company's aviation department, and G. M. McJunkin, head of aircraft maintenance, visited the Lockheed factory in June to complete arrangements for fitting out the cabin. The first oil company to order an Electra was Phillips Petroleum Company, Bartlesville, Okla.

Kinner

Edward F. Booth, Inc., of Love Field, Dallas, Texas, have been appointed Kinner Aircraft dealers by the Kinner Airplane & Motor Corp., Ltd., of Glendale, California. Mr. Booth, president of the company, took delivery of a Sportster at Glendale on the 25th of June.

Mr. Dan H. Wallace of Santa Barabara, recently appointed dealer for the Kinner Airplane & Motor Corp., took delivery of a Sportster, powered with a 125 h. p. Kinner engine on June 20th at the factory. Mr. Wallace will make his headquarters at Carpenteria Airport and his ship will be used for both instruction and demonstration purposes.

Parks Air College at St. Louis, Missouri, have been appointed Kinner aircraft dealers and will take delivery of two Sportsters immediately at the factory.

Mr. George Brent, prominent moving picture actor, has taken delivery of a deluxe Sportwing.

Mr. Richard C. du Pont of Wilmington, Delaware, left Glendale on June 2nd with his new Sportwing. This ship was painted all gold and proved to be a very beautiful ship.

Mr. A. R. (Gus) Parrish has placed an order for a Kinner Sportster to use in his operations at Mines Field in the summer and Palm Springs in the winter.

Mr. Jos. W. Harper of Hollywood is proudly displaying his new Sportwing, following the sale of his other Sportwing, which was not equipped with ring and pants, to Joe Plosses. This is the third Kinner ship which Mr. Harper has purchased in the past year, each time selling his old ship in order to replace it with a new model.

Mr. A. J. Rountree, Mayor of Lake City, Florida, has purchased a Sportster.

Aeronautics Branch Changes Name

Effective July 1, the name of the Aeronautics Branch of the Department of Commerce will be changed to Bureau of Air Commerce, John Dickinson, Acting Secretary of Commerce, announced June 23rd. Likewise the office of Director of Aeronautics will be known as Director of Air Commerce. Authority for the change is contained in an order signed by Secretary Roper just before his departure from Washington for the Pacific Northwest.

"The name 'Bureau of Air Commerce' more accurately describes the duties and functions of this organization," Dr. Dickinson said. "Although it has enjoyed the status of a bureau and ranks equally with the other bureaus of the Department, it has never been so designated. The change in name is further desirable to prevent confusion between commercial aeronautics as typified by 'air commerce' and the aeronautical activities of other branches of the government.

Dobie Returns from Luft Hansa

Richard Dobie, Southwestern Pilot and veteran million-mile member of United Air Lines flying personnel, returned from Berlin last month after a two-month tour of duty in Germany to familiarize pilots of Luft Hansa with the handling of Boeing 247 transports purchased for operation on the air lines linking Berlin with Paris and London.

Officials of Luft Hansa expressed satisfaction with the high speed planes. Eight officers of the foreign air line were flown from Travenmude to Berlin, 180 miles, in sixty minutes over all time.

Lee Smith Returns to Stinson

Last week the Stinson Aircraft Corporation announced that Captain LEE H. SMITH had returned to the States from the Phillipines and had rejoined the Sales Division of the Company and would be stationed in the Southwest.

"Mr. Smith came with us in 1931 after several years of successful sales and production experience with a large electrical manufacturer," said B. D. DEWEESE, President. "He went to the Phillipines in late 1932 to set up and operate Stinson Trimotors, powered by

Captain Lee H. Smith and Eddie Miller, Mechanic, beside a Model "U" Stinson Tri-motored Airliner.

Lycoming, for the Iloilo-Negros Air Express Company, which soon began to fly regular schedules over 775 miles of lines, principal of which was the run between Manila and Iloilo. The line has been very successful but Mr. Smith's longing to return to the States was our good fortune and we are glad to welcome him back into the fold.'

"Smith," said DeWeese, "flew during the war and has piled up some three thousand hours since, twelve hundred of which have been tri-motor hours over long water routes and through tropical weather, neither too good, therefore timid folks will not need to worry about flying with the Captain."

"Stinson sales have been good in the Southwest," said DeWeese, "as we build a plane for long distance trips cross-country and such is needed in the wide open spaces. To date there have been more Stinson 'Reliants' delivered in the Southwest than during any other half-year, and we are proud of the adoption of these for the crack Amarillo, Dallas, Fort Worth and Brownsville Air Mail run."

Boeing School of Aeronautics

Expanding its ground school equipment by the addition of more instructional apparatus, the Boeing School of Aeronautics at Oakland, Calif. now offers detailed visual instruction in power plant supercharging, T. Lee, Jr., general manager, announces.

Instructors Herbert Marsh and E. J. Camy of the Aircraft Power Plans Shop have constructed a sectioned assembly of the blower section of a Wasp motor. The assembly shows the arrangement of supercharger impeller, gear train, clutch and drive, with all the various bearings, cylinders, collars, and shafts in their proper location. The assembly complements a sectionalized Wasp motor cut away to show major internal parts.

Training in the construction of exhaust collector rings for air-cooled aircraft engines is now a feature of sheet metals instruction at the school.

One of the Model 203 Boeing-built training planes of the Boeing School of Aeronautics' training fleet has recently passed its 4,000th hour of flight duty in connection with instruction of pilot training courses, reports Director of Flight Instruction George Myers. The plane, which is rated as the "dean" of the Boeing training fleet, was recently inspected by an engineer of the Boeing Airplane Company and pronounced in as good structural condition as when it was first flown.

Work on inspection and overhaul of light aircraft engines has been afforded Master Mechanic students at the Boeing School of Aeronautics, Oakland, Calif. recently, when two 60 h. p. radial air-cooled engines were sent through the shops. Normally, engine shop students work on engines varying from 110 h. p. to 425 h. p.

Date Changed

The revised "Airworthiness Requirements for Aircraft," (Aeronautics Bulletin No. 7-A), will become effective August 1, 1934 instead of July 1, Eugene L. Vidal, Director of Aeronautics, announced today. Aeronautics Bulletin No. 26, "Design Information for Aircraft," a new bulletin presenting material supplementary to the requirements, also will be published under date of August 1.

Postponement of the effective date was necessary to allow time for making additional revisions some of which were suggested at the conference of the Aeronautics Branch with aircraft manufacturers in Washington May 22.

United Headquarters in Chicago

Reorganization of the Operations Division of United Air Lines and establishment of general operations headquarters at the Chicago municipal airport to place the company's system under five operations divisions has been completed, according to W. A. Patterson, president of the company.

The divisions include: Cleveland Division (Newark-Chicago); Chicago Division (Chicago-Cheyenne and Chicago-Kansas City); Salt Lake Division (Cheyenne-Oakland); Oakland Division (San Diego-Medford); and Portland Division (Seattle-Portland-Pendleton-Spokane-Boise).

The personnel of the Operations Division is headed by D. B. Colyer, vice president in charge of operations, and includes E. P. Lott, manager of operations; F. E. Caldwell, general superintendent; R. E. Pfen-

nig, assistant general superintendent; H. O. West, superintendent of maintenance; J. R. Cunningham, superintendent of communications; K. K. Knickerbocker, manager of passenger service, and chief Pilots H. T. Lewis (west), W. D. Williams (mid-west) and Walter Addems (east). R. D. Edwards, formerly Chicago station manager, has been placed in charge of overhaul and repair at Cheyenne, where all repair and overhaul has now been concentrated.

Westport Builds Aircraft Dynamotor

Eliminating B and C Batteries, a new light weight and compact dynamotor has been introduced by Westport Manufacturing Company, Glendale, Calif., for use in conjunction with aircraft radio receivers.

The Westport dynamotor consists of a motor generator which draws 12 or 6-volt current from an aircraft A battery and delivers proper B and C voltages. To operate from 12 or 6-volt batteries, models are available for delivering 180 and 90 volts at 60 milliamperes; 180, 90 and minus 12 volts at 40 milliamperes, and 250 and 125 volts at 50 milliamperes. The ratio of power output to input is high.

Complete with filter, the Westport dynamotor weighs less than seven pounds. Its cadmium plated steel case and mounting base measure only 7 x 6 x 3 inches overall. The unit may be mounted in any convenient place in the airplane, and requires only one cable, the conventional B battery lead.

A dynamotor is recommended for use when the A battery is equipped with a battery charging generator to keep up the A battery voltage. The dynamotor delivers constant plate voltage to the receiver, while B batteries experience a constant drop in voltage during use. Weighing less than seven pounds, the Westport dynamotor is more than two pounds lighter than a unit-type aircraft B battery.

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Aircraft 1934

(Continued from Page 11)

in about 16½ seconds. No attention is necessary on the pilot's part other than throwing the switch. An emergency manual control is also provided and suitable warning devices as well as a pointer in the cockpit which indicates the position of the landing gear at all times. With the power retracting mechanism it is possible to retract the wheels immediately when the plane leaves the ground. An interesting feature of this method of operation is the fact that the wheels are usually completely up in the wing by the time the plane clears the boundary of the field on the take-off.

The gear itself is composed of a single cantilever duralumin strut of rectangular section, to the upper end of which is fastened a segment of wrom wheel. The lower end of this box-like strut contains an oleo shock absorber unit to which a stub axle is attached. The wing carries an automatically operating fairing which completely closes the wheel well and renders the bottom surface of the wing perfectly flush when the landing gear is retracted. A single cable runs from a suitable point on the landing gear back through the fuselage to the tail wheel. This cable retracts the tail wheel partially as the landing gear itself is retracted.

The wing flaps are controlled by the same electric motor and auxiliary hand crank which operates the retractable landing gear. This is accomplished by means of a small sliding gear transmission. Either the landing gear or the flap can be operated electrically or by the auxiliary hand crank or both can be operated together, one by the hand crank and the other by the electric motor. An indicator in the cockpit shows the position of the wing flap at all times and positive stop switches are provided to limit the motion of the flap either up or down.

The tail surfaces, like the wing, are of "shell" type construction. The fin and stabilizer are both built solidly into the fuselage. An adjustment similar to that effected by moving the fin, is accomplished by setting an adjustable flap on the trailing edge of the rudder. Similar flaps on the elevators, which are operated by means of a wheel in the pilot's compartment, take care of the stabilizer adjustment.

The construction of the fuselage is of a modified elliptical cross section, circular arcs of one radius form the top and bottom, and arcs of a larger radius form the sides. These radii fair into each other. A flat Alclad sheet, its long dimensions running transverse to the longitudinal axis if the fuselage, is laid over transverse U-Section diaphragms, each panel lapping back over the panel behind it. Inasmuch as these panels are relatively short in proportion to the total length of the fuselage, it is not necesary to form the sheet.

The engine mount is attached to fittings on the fire wall by means of precision ground bolts. These units are accurately jig-built so that the entire power plant assembly including cowling, oil tank and all lines and engine controls forward of the fire wall is completely interchangeable with that of any other V-1A model airplane. Special effort has been made to secure quickly detachable connections for all lines and engine controls to that it will no longer be necessary to tie up the ship in order to overhaul the engine. Instead an overhauled power plant assembly can be installed and the ship put into the air again and the removed assembly can be overhauled and kept in reserve as a replacement for the next ship requiring service.

Ball bearing or other type of non-friction bearings are used in practically all moving parts of the plane. All control operating assemblies are so located as to be easily accessible for inspection or repair.

Particular attention has been paid to the comfort of both pilots and passengers. The pilot's cockpit incorporates a forward slanting vee type windshield which is designed to eliminate glare from lights on the ground and affords good forward vision even in heavy rain. The pilot's cockpit is sound-proofed. The passenger compartment is separated from the pilot's cockpit by a sound-proofed bulkhead. The passenger cabin has also been completely sound-proofed by Western Electric acoustic engineers. The extensive use of sound insulating material and noise filters in all ventilators and heater openings has resulted in a passenger cabin which is quieter than a Pullman car. The low noise level obtained is 68 decibels. It is possible to talk from one end of the cabin to the other in a normal tone of voice while cruising at 215 miles an hour.

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2	Wright J-6-9 Stinson SM1-D—Cleveland	2,500
3	Wright J-6-9 Stearman 4CM1—Fort Worth, Cleveland, St. Louis	5,000
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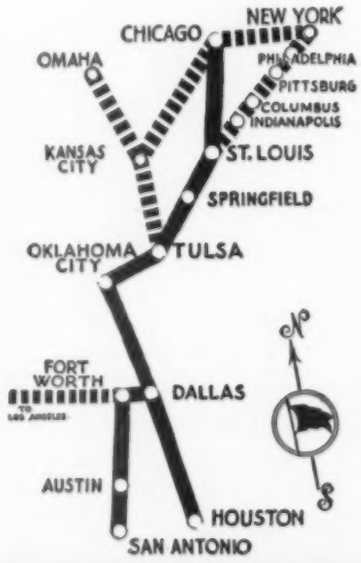
and
EAST



Bowen Air Lines

From Washington

(Continued from Page 14)

Department of Commerce's own funds are put to advantage in seeing what can be done to provide a substantial approach to the Poor Man's Plane for use of the Bureau of Air Commerce's own inspectors.

The specifications presented do not require a Philadelphia lawyer to tell at once what he is driving at. The bids will give some idea as to the minimum to which prices can eventually be forced.

What he "officially" wants are '25 small, inexpensive two seated planes" of design, construction and performance not met by "any plane now in production" . . . "simplicity, safety, m. p. h., minimum top speed of 110 m. p. h. . . . "giving 25 miles per gallon of fuel at cruising speed.

It is generally believed that from these 25 planes there will eventually be developed the covetted "Poor Man's Plane."

The Alaskan Flight

Alaska is the goal of an army bomber flight of 7,500 miles. The round trip hop has been announced by the secretary of War, being routed over Canada. To provide a practical demonstration of Army Air Corps efficiency, 10 twin-engined bombing planes will take off from Washington early in July. The Canadian Government has sanctioned the flight of American Military Planes over the Dominion.

Despite the fact that military officials have listed the purposes of the flight as "training and photography," those in the know nurse a strong conviction that this is an effort on the part of the Army to overcome criticism of inefficiency in the Air Corps with a spectacular and difficut group maneuver. Regardless of the motives for the flight, the group personnel carry with them well wishes for their success.

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Editorials and Comments

(Continued from Page 3)

receive about one hour per week under the hood. Total hours in blind flying have been increased to a total of 30 hours, which includes the training period at Randolph and Kelly Fields.

It seems that the long struggle to increase this necessary training has at last borne fruit. The innovation of training the students in blind and instrument flying at the *beginning* of their flight training instead of at the close indeed marks a progressive step forward in the training of our military pilots.

Jimmy Wedell

Jimmy Wedell has flown under the horizon. The nation mourns his loss; but it is in our region that the loss will be most keenly felt. It was the daily, weekly and monthly personal contacts with Jimmy that endeared him to all who knew him intimately.

Into his life is written one of the most colorful chapters in the development of American aviation. International fame came to him through his uncanny ability to build and fly airplanes at speeds that have never been equalled. His fame and genius are eclipsed in brilliancy only by Jimmy's devotion to the art that brought him fame.

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